

Regional population projections for China

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Abstract

Considering the size and the regional diversity of China, a prudent analysis of many economic and policy issues needs to consider the regional differences in climate, soil, water, and other natural resource endowments, population density, and social and economic development. Future-oriented multiregional assessments require regionally detailed scenarios. A key component of such scenarios is the evolution of the population in different regions. For studies of land-use change and agriculture, such regionally disaggregated population projections are needed for estimating regional food demand and regional labor supply. These scenarios can also serve as background information for modeling development-induced migration, if migration processes are explicitly modeled.

With China's increasing integration in the world economy, the number of studies analyzing different features of this process has been booming recently. An increasing number of studies undertake their assessments at some level of regional detail and need regional scenarios to provide background information about the geographical distribution of people. The regional population projections presented in this report are developed for use in such studies.

The report combines national-level demographic scenarios for the period 2000 through 2030 with information about the provincial population distribution from the year 2000 census and projections of provincial birth-rate, death-rate, urbanization, and interprovincial migration based on historical data. Results are available at three levels of regional resolution and age-group aggregation. This report presents the regional population projections at two levels. At the first level, the provinces are merged into eight economic-geographical regions. This level of aggregation makes modeling activities more tractable, but it still preserves a reasonable degree of spatial homogeneity. At the more detailed level, we consider the 31 provinces as the officially defined jurisdictions delineate them (as of 2000). The present report contains tables of urban, rural, and total population aggregated to three main age groups: 0-14, 15-64, and 65 and above for the provinces and for the eight regions. At the third and most detailed level, comprehensive tables covering 17 five-year age groups, 31 provinces and the 8 regions, rural, urban, and total population are also available.

Acknowledgment

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1. INTRODUCTION

1.1 Background, context, and objectives

The general objective of the project on “Chinese Agricultural Transition: Trade, Social and Environmental Impacts” (hence the CATSEI project) to investigate the impact of China’s current economic transition on its agricultural economy with special reference to the consequences of trade liberalization and of changing trade flows. An essential tool to support policy analysis is a multiregional applied general equilibrium (AGE) model of the Chinese agricultural sector based on detailed models of the land and water resources as well as the agronomic processes. Both the policy analysis and the AGE modeling activities require a clear portrayal of the broader social and economic context and factors that will decisively shape the future of the food and agricultural sectors. The broader context and the crucial external factors need to be summarized in a harmonized set of assumptions and clearly presented in the form of scenarios. The set of scenarios to be used in the CATSEI modeling and policy analysis covers plausible future trends of all important social, economic, and political processes that are not modelled endogenously in the project.

Given the size and the regional diversity of China, any sensible analysis must consider the regional differences in climate, soil and water resource endowments, population density, and social and economic development. Multiregional assessments require regionally detailed scenarios. A key component of such scenarios is the evolution of the population in the different regions. Such regionally disaggregated population projections are needed for estimating regional food demand and regional labour supply. They can also serve as background information for modeling development-induced migration, if migration processes are explicitly modelled.

The regional population projections presented in this report are developed primarily for use in the CATSEI project. Yet, with China’s increasing integration in the world economy, the number of studies analysing different features of this process has been booming recently. An increasing number of studies undertake their assessments at some level of regional detail and need regional scenarios to provide the background information. Therefore it is hoped that other research groups will also find useful these regional projections.

Notwithstanding the expectation that our results might be of potential interest to other users, the method and data aggregation level reported here are tailored to the objectives and requirements of the CATSEI project. This requires a solid, methodologically consistent and transparent procedure results of which can be considered a good approximation of provincial population characteristics. The main uses of the results in CATSEI include food demand and labour supply as input to the multi-regional integrated land-economy AGE model. For these purposes, a broad-brushed picture of the main characteristics of the population (numbers in different age-groups in rural and urban areas across the provinces) is sufficient, high-precision demographic details are not required.

This report presents the regional population projections at two levels. At the more detailed level we consider the 31 provinces as the officially defined jurisdictions delineate them (as of 2000). At the second level, the provinces are aggregated into eight economic-geographical regions defined in this project based on earlier activities in the Land Use Change and

Agriculture (LUC) project at IIASA. This level of aggregation makes modeling activities more tractable, but it still preserves a reasonable degree of homogeneity within and differentiation across the regions. Henceforth we refer to these regions as LUC regions.

1.2 Conceptual foundations and key assumptions

The *ideal procedure* to prepare regional population projections would involve calibration of regional models based on reliable, generally accepted, and detailed region-specific information about the main driving forces: fertility, mortality, and migration rates according to gender, age, education, and residence (rural versus urban). These regional projection models should then be simultaneously run on a joint accounting platform that keeps track of population movements across the regions and updates the regional model accordingly over time. Unfortunately, the reality is very far from such ideal conditions. First, there is a considerable degree of disagreement about the initial conditions: results of the year 2000 census are widely disputed in the demographic community in China and outside. Second, the availability and reliability of detailed information at the provincial scale is rather unbalanced: some regions seem to have good records while data concerning other provinces are scarce or less reliable.

With a view to the above circumstances, our *modeling strategy* for producing province-level population projections entails the incorporation of relevant data from diverse sources, their harmonization to ensure consistency, and the preparation of detailed projections by using the maximum amount of information available about the relevant features of the Chinese population. The core building blocks of the projection model are the national-level projections of urban and rural populations by age groups prepared by Cao (2008) and the population distribution across provinces in rural and urban areas by age groups reported by the year 2000 census (NBS, 2002a). Additional information sources include provincial projections of birth rates and death rates, projections of provincial urbanization rates, and the magnitude, direction, and age structure of interprovincial migration.

The modeling procedure itself is based on the following *key assumptions*: the range of possible future evolution of the population in China is properly depicted by Cao's national projections, while the best source of the provincial distribution is the year 2000 census. From this longitudinal (national population over time) and cross-sectional (provincial distribution in 2000), an appropriate decomposition procedure can be developed that provides the evolution of provincial population over the next few decades. The decomposition procedure can be enhanced and the precision of the results can be increased by drawing on information from supplementary models like statistics-based projections of regional birth rates, death rates, urbanization rates, and interprovincial migration.

The implementation of the above modeling strategy by using the above assumptions results in the following steps in our *modeling procedure*:

- harmonize the year 2000 values in the national-level projections with those in the year 2000 census;
- then, for each five-year time step:
- calculate the size of the provincial 0-4 age-groups from the national-level projections by accounting for the provincial differences in fertility as they are captured by statistically estimated extrapolation of provincial birth rates;

- calculate the size of all other age-groups by accounting for the provincial differences in mortality as they are captured by statistically estimated extrapolation of provincial death rates;
- establish the distribution of provincial populations between urban and rural groups by considering the provincial differences in urbanization rates as they are captured by a statistically estimated extrapolation of provincial urbanization rates;
- augment the provincial population values by accounting for interprovincial migration as they are captured by statistically estimated extrapolations of magnitudes and directions of migration flows.

The general ordering principle is that the nationally aggregated provincial population numbers must match the national-level projections by Cao taken as a starting point in terms of all main features: age-group totals in urban and rural areas for each five-year time-step. The computer code implementing the disaggregation procedure contains several routines checking the consistency of the re-aggregated provincial results with the original national-level values.

2. DATA SOURCES

The procedure to develop regional population projections draws on six main sources. They range from a set of national-level projections and the regional population distribution documented in the year 2000 census to the projections of birth rates, death rates, and urbanization rates at the province level as well as projections of interprovincial migration flows. The method presented in the next section attempts to utilize the maximum amount of information available from these sources. Unfortunately, the reliability of data from different sources varies considerably. Therefore, an important task is to reduce inconsistencies across the data sources to the extent it is possible. It is fair to say that our results are more reliable at higher aggregation levels (multiple age groups, larger regions) than at the very detailed level. This section presents and documents each data source in turn.

2.1 National multi-state population projections

Cao (2000) prepared a series of multi-state population projections for China as a whole by distinguishing demographic patterns (fertility, mortality, migration) in the future according to education achievement and the place of residence (rural or urban) in addition to the usual male–female differentiation. She clustered her assumptions in a scenario matrix along two groups of attributes: fertility, mortality, educational achievements, and migration on the one hand, and convergence of fertility levels in educational categories and in the urban/rural regions, on the other. Migration throughout this paper refers to internal (domestic as opposed to international) migration and the numbers always indicate the size of net migration flows. The first dimension in Cao’s matrix leads to three clusters:

- low scenarios: low fertility, low mortality, high education, low migration;
- central scenarios: central fertility, central mortality, central education, central migration;
- and
- high scenarios: high fertility, high mortality, low education, high migration.

Different assumptions about the convergence of fertility levels along the second group of attributes give variants within the low, central, and high scenario groups.

The span of all scenarios in Cao (2000) in terms of projected population for the year 2045 is 1.37 to 1.59 billion people. The large number of scenario variants provides interesting insights into the details of the population evolution. Not surprisingly, however, fertility dominates the final outcome. Variations in the assumptions about the other determinants of population change lead to relatively small variations within the scenario family. There is a rather simple explanation for that. Due to historical reasons, especially the tight fertility policy in China over the past decades, fertility rates are already low and even large variations around a central value in percentage terms lead only to minor variations in the resulting total population. Similarly, the relatively high life expectancy leaves little room for creating large differences in the total population by varying the expected future life times and the resulting death rates.

Although there are clear differences both in fertility rates and mortality patterns between the rural-urban population groups and among the different educational categories, the relatively homogeneous characteristics described above do not lead to large deviations across the different convergence scenario variants.

For the purposes of the regional population projections presented in this report, a new set of national projections has been prepared. The most important novelty of the new projection set compared to Cao (2000) is that Cao (2008) reestimated the fertility, mortality, and other demographic parameters based on the year 2000 census. This increases the consistency of the two major data sources of the present study and provides a set of projections based on the most up-to-date demographic data.

Considering the limited effect on mid-term 2030 population levels of the differences in educational achievements and their different convergence ratios on fertility rates (under the special conditions in China), the new projections do not disaggregate female age groups according to their education level.

The new projections have the following features. The Medium (MM) scenario involves medium total fertility rates declining only slightly from 1.28 in the 2000-2005 period to 1.26 in the 2025-2030 period in urban regions and from 1.95 to 1.83 in the rural regions over the same timespan. This scenario takes also the middle value of the net rural-urban migration projections amounting to over 281 million people between 2000 and 2030 and slightly decreasing in each five-year period. In comparison, the Low scenario entails 13% higher net migration (staying constant) and faster decline of fertility rates in both the urban and rural regions relative to the MM case, whereas the High scenario includes 13% less net migration (with a sharper decrease in each 5-year period) and increasing fertility rates in the urban (from 1.28 to 1.35) as well as in the rural (from 1.95 to 2.08) regions between 2000 and 2030. Finally, the High2 scenario is a variant of the High case in which a faster increase of the urban fertility rate is assumed (reaching 1.54 in the 2025-2030 period). The Low scenario (lowest total population in 2030) results in the highest urbanization level among the four scenarios. Assumptions about the evolution of urban and rural fertility rates in the four scenarios are presented in Figure 2.1.

Table 2.1 presents an overview of the four national level projections. The range of projected total population levels spread between about 1380 million and 1428 million (see Figure 2.2.).

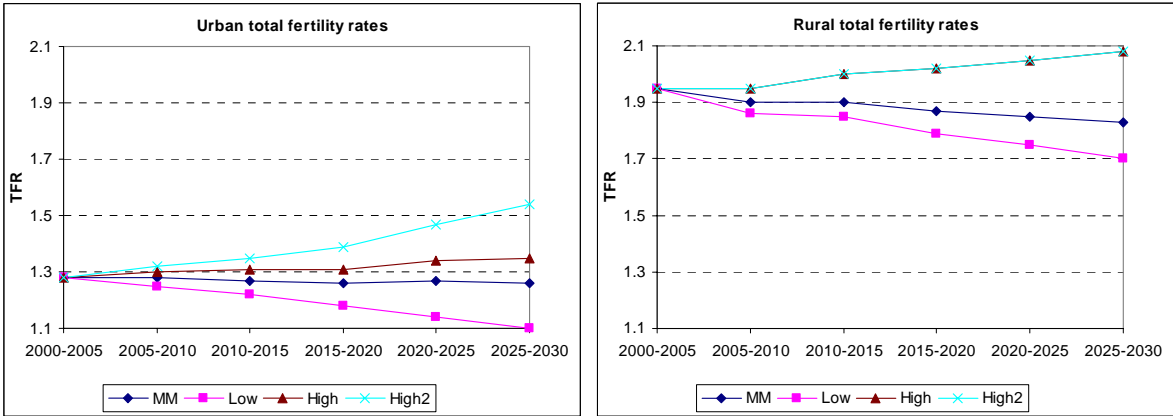


Figure 2.1 Urban and rural total fertility rate assumptions in the four scenarios up to 2030.

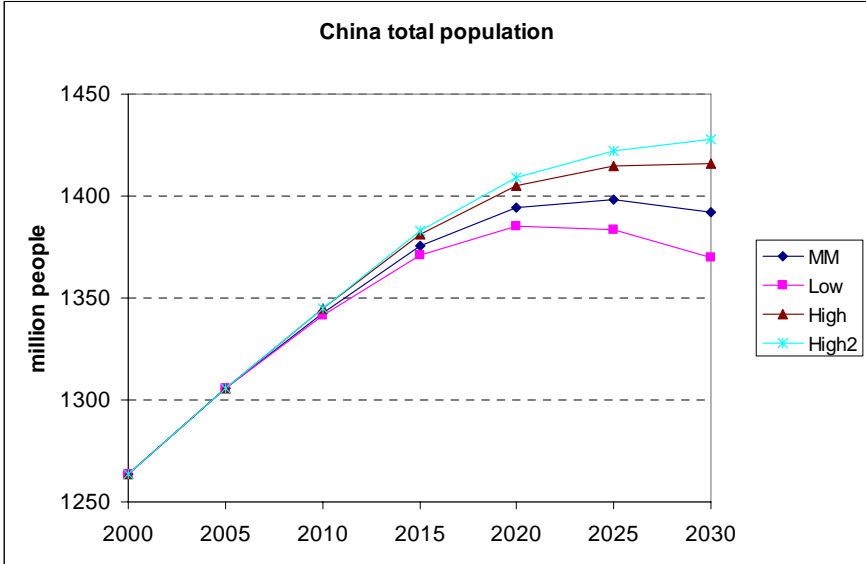


Figure 2.2 Total population of China in the four national level projections from 2000 to 2030.

Table 2.1: Projections of rural, urban, and total population for China under different scenario assumptions (1000 people). Source: Cao (2008)

MM					
	urban	rural	total	Urban share %	
2000	458,771	804,655	1,263,426	36.31%	
2005	528,054	777,550	1,305,604	40.45%	
2010	597,549	745,273	1,342,821	44.50%	
2015	663,929	711,801	1,375,730	48.26%	
2020	723,214	671,317	1,394,531	51.86%	
2025	775,427	623,009	1,398,436	55.45%	
2030	822,816	569,497	1,392,313	59.10%	
Low					
	urban	rural	total	Urban share %	
2000	458,771	804,655	1,263,426	36.31%	
2005	528,054	777,550	1,305,604	40.45%	
2010	599,325	741,921	1,341,245	44.68%	
2015	669,443	701,518	1,370,961	48.83%	
2020	734,564	650,576	1,385,141	53.03%	
2025	794,612	588,686	1,383,298	57.44%	
2030	851,451	518,413	1,369,863	62.16%	
High					
	urban	rural	total	Urban share %	
2000	458,771	804,655	1,263,426	36.31%	
2005	528,054	777,550	1,305,604	40.45%	
2010	595,357	749,277	1,344,634	44.28%	
2015	657,466	723,777	1,381,243	47.60%	
2020	710,416	694,705	1,405,120	50.56%	
2025	754,427	660,509	1,414,936	53.32%	
2030	792,247	623,783	1,416,030	55.95%	
High2					
	urban	rural	total	Urban share %	
2000	458,771	804,655	1,263,426	36.31%	
2005	528,054	777,550	1,305,604	40.45%	
2010	595,877	749,277	1,345,155	44.30%	
2015	659,265	723,777	1,383,042	47.67%	
2020	714,457	694,705	1,409,162	50.70%	
2025	761,712	660,509	1,422,221	53.56%	
2030	804,170	623,783	1,427,953	56.32%	

The range of scenarios used in this study is somewhat narrower than population levels projected by the UN. The projections are based on a carefully defined and realistic range of fertility assumptions: a total fertility rate in 2030 of between 1.1 – 1.54 in urban areas (TFR estimated to be 1.28 in 2000) and of 1.70 – 2.08 for rural areas (estimated at 1.95 in 2000).

2.2 Regional and rural-urban population distribution: the 2000 census data

The most recent regionally disaggregated population statistics for China can be obtained from the latest census conducted in the year 2000. Yet the use of data from the year 2000 census might raise some problems for our study because there is some controversy about the reliability of the 2000 census data, especially for rural regions and some younger age groups.

It is far beyond the scope and objectives of the present study to assess the quality and reliability of the year 2000 census. Our disaggregation procedure involves a simple adjustment algorithm that harmonizes Cao's population numbers and the census data to the extent possible. The inconsistencies between the two datasets (Cao's rural-urban distribution and age group patterns in 2000 and those of the year 2000 census) lead to some small imbalances across age groups, especially in relatively small and already highly urbanized provinces. Therefore, special adjustment mechanisms are also incorporated into the disaggregation procedure to detect and correct these imbalances so that the results are both internally consistent and externally coherent with Cao's national-level projections. Moreover, these minor imbalances are smoothed out when the five-year age groups are aggregated into larger groups. Therefore at this higher level of aggregation, the results reflect the best possible compromise and harmonization between the two data sources.

Table 2.2 presents the population distribution between the rural and urban areas in the 31 provinces based on the Year 2000 census. In addition, it shows the same population data aggregated into the eight major economic regions defined for this project.

Table 2.2 Rural, urban, and total population in China's 31 provinces and in the 8 LUC-regions according to the year 2000 census (1000 people). Source: NBS –CD (2003).

CENSUS 2000

Province	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1258	8378	886	585	2205	257	10522	3047	13569	77.55
Tianjin	998	5484	608	653	1885	220	7090	2759	9849	71.99
Hebei	3334	13204	1021	11856	33590	3678	17560	49124	66684	26.33
Shanxi	2553	8269	609	5802	13791	1446	11432	21039	32471	35.21
Inner-Mongolia	1951	7512	497	3002	9575	788	9959	13365	23323	42.70
Liaoning	3541	17599	1826	3852	13535	1471	22966	18858	41824	54.91
Jilin	2221	10267	822	2851	9843	797	13311	13492	26802	49.66
Heilongjiang	3164	14378	1129	3681	12999	886	18672	17566	36238	51.53
Shanghai	1764	11088	1638	247	1429	242	14490	1918	16408	88.31
Jiangsu	5304	23239	2320	9038	29005	4138	30862	42181	73044	42.25
Zhejiang	3610	17144	1602	4683	16395	2496	22357	23574	45931	48.67
Anhui	3352	11360	1054	11688	28120	3426	15766	43234	59000	26.72
Fujian	2681	10782	844	5163	13192	1436	14307	19791	34098	41.96
Jiangxi	2377	8174	634	8087	19228	1898	11185	29213	40398	27.69
Shandong	6421	25635	2270	12321	38285	5039	34326	55646	89972	38.15
Henan	4611	15524	1251	19015	45605	5231	21385	69851	91237	23.44
Hubei	4692	18027	1370	8879	24092	2449	24089	35420	59509	40.48
Hunan	3242	13092	1063	10757	31456	3663	17398	45876	63274	27.50
Guangdong	8998	36084	2350	11553	23330	2910	47432	37793	85225	55.66
Guangxi	2596	8994	761	8889	20173	2442	12350	31504	43855	28.16
Hainan	725	2182	167	1348	2794	343	3075	4484	7559	40.68
Chongqing	1704	7610	781	4958	13795	1664	10096	20417	30513	33.09
Sichuan	3935	16851	1524	14665	40668	4705	22310	60038	82348	27.09
Guizhou	2025	5947	474	8608	16564	1629	8445	26802	35248	23.96
Yunnan	1928	7424	550	9068	21359	2030	9903	32457	42360	23.38
Tibet	109	384	16	707	1292	109	508	2108	2616	19.43
Shaanxi	2245	8462	661	6575	15907	1515	11368	23997	35365	32.15
Gansu	1173	4546	300	5594	12504	1008	6018	19106	25124	23.95
Qinghai	318	1170	72	977	2138	148	1559	3263	4823	32.33
Ningxia	380	1317	82	1176	2367	163	1780	3706	5486	32.44
Xinjiang	1298	4669	281	3736	7895	582	6247	12212	18460	33.84
Total 31prov	84510	344796	29465	200018	525015	58809	458771	783841	1242612	36.92
LUC-regions										
North	19175	76495	6646	50234	135362	15871	102316	201467	303782	33.68
Northeast	8926	42245	3778	10384	36377	3155	54949	49915	104864	52.40
East	14029	62830	6615	25657	74948	10302	83475	110907	194382	42.94
Central	10311	39293	3067	27723	74776	8010	52672	110509	163181	32.28
South	12405	49048	3361	18064	39316	4688	64814	62068	126882	51.08
Southwest	12190	46825	4090	46189	112559	12471	63105	171219	234323	26.93
Plateau	426	1554	88	1685	3430	257	2068	5371	7439	27.80
Northwest	7047	26506	1820	20083	48247	4056	35373	72385	107759	32.83

Note: The composition of the LUC-regions is as follows:

North	Beijing, Tianjin, Hebei, Shanxi, Shandong, Henan
Northeast	Liaoning, Jilin, Heilongjiang
East	Shanghai, Jiangsu, Zhejiang, Anhui
Central	Jiangxi, Hubei, Hunan
South	Fujian, Guangdong, Hainan
Southwest	Guangxi, Chongqing, Sichuan, Guizhou, Yunnan
Plateau	Tibet, Qinghai
Northwest	Inner-Mongolia, Shaanxi, Gansu, Ningxia, Xinjiang

The “Total 31 provinces” line indicates the sum of the corresponding provincial populations based on the NBS-CD and does not include special territories, military population, etc. therefore the numbers slightly differ from the “China total” in the Statistical Yearbook (NBS, 2002b).

2.3 Provincial birth rate projections

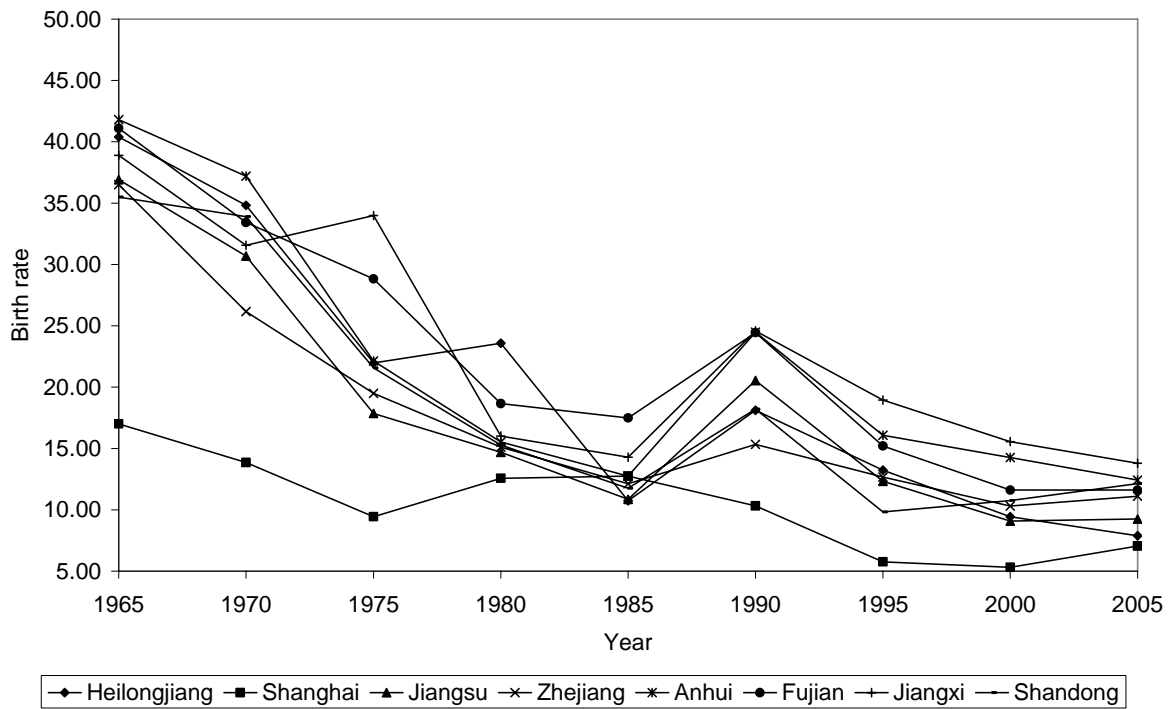
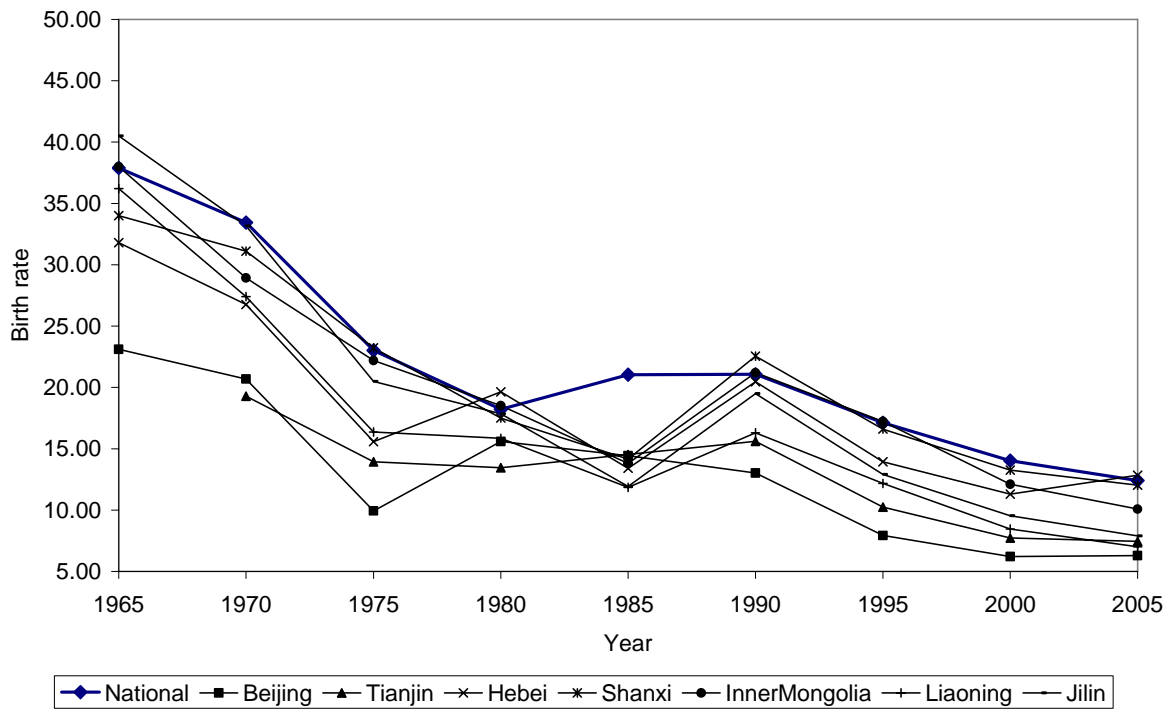
The provincial disaggregation of the nationally projected age groups is based on the population distribution depicted by the 2000 Census. The disaggregation of the newly born age groups, however, requires a special procedure. The simplest solution would be to keep the distribution of the new age groups constant according to the year 2000 pattern. However, this would result in increasing distortions as we proceed further into the future because it ignores the variations in the dynamics of birth rates across provinces.

The method applied here extrapolates provincial birth rates to make a shortcut to doing full multi-state regional population projections instead of making assumptions about fertility rates over time in each province, and applying them to an evolving age structure of the provincial populations. Birth rates, unlike fertility rates, include the effects of age structure, without actually calculating the age structures themselves. Therefore, the quality of the disaggregation of the newborn age group depends to a large extent on the quality of the provincial birth rate extrapolation. This is likely to be acceptable because the time horizon is thirty years and thus much of the age structure of the childbearing population over the next three decades is well known.

Over the past forty years, provincial birth rates have been converging towards a gradually sinking national birth rate from widely diverging values in the 1960s. The national birth rate has declined from 37.88 in 1965 to 15.23 in 1999. A logistic approximation of this declining trend gives the best fit when we assume the limit value of 13.

We use this logistic model to extrapolate provincial birth rates into the future. We establish the provincial limit values for 2050 by following a simple rule of thumb. We assume that provincial birth rates will continue converging and the difference between the provincial birth rates and the national birth rate in 1999 will be reduced to half by the year 2050. For most provinces, we fit a logistic curve to historical data and use the resulting parameters with this functional relationship to extrapolate provincial birth rates into the future. However, some provinces are already far below the national average projected for 2050: Beijing 6.50, Shanghai 5.40. For these provinces, we assume a slight recovery from these extremely low birth levels to a limit value of 8 by the year 2050. Figure 2.1 illustrates the declining and converging birth rates in the past. Results of the logistic extrapolation of provincial reference birth rates up to the year 2030 are presented in Table 2.3.

Figure 2.3: The historical evolution of birth rates in the 31 provinces and the national level from 1965 to 2005. Source: NBS (2001, 2006). Note: Birth rates are defined as the number of births per 1000 people.



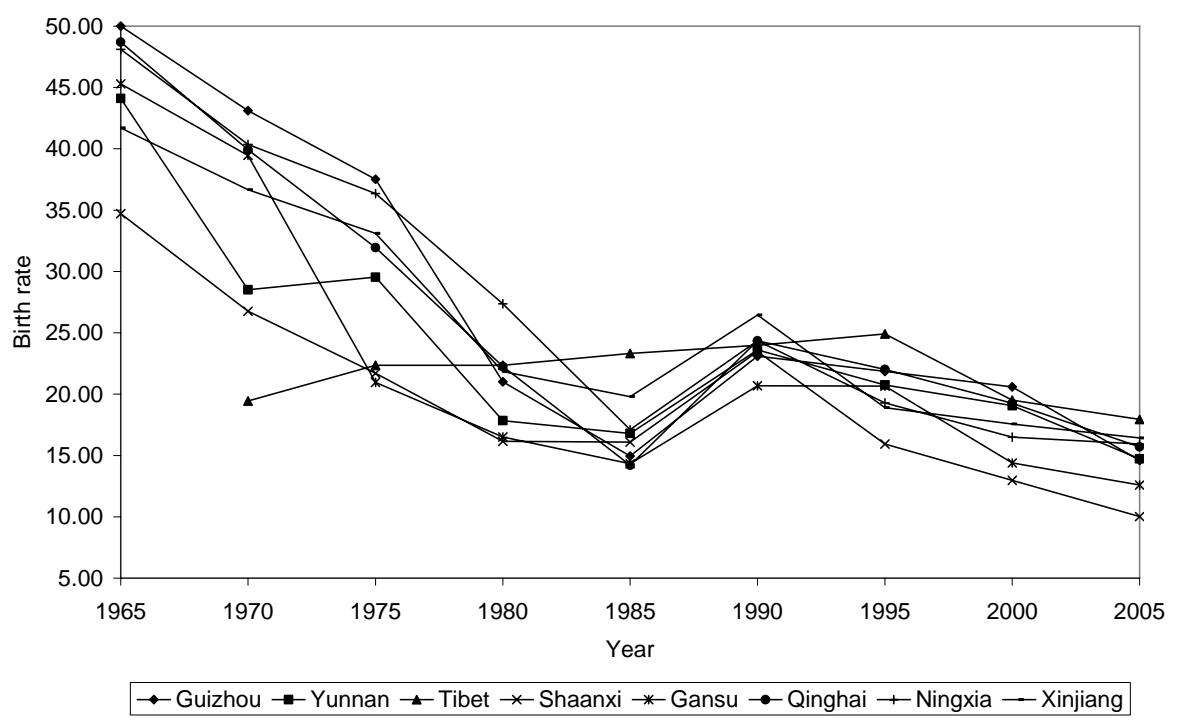
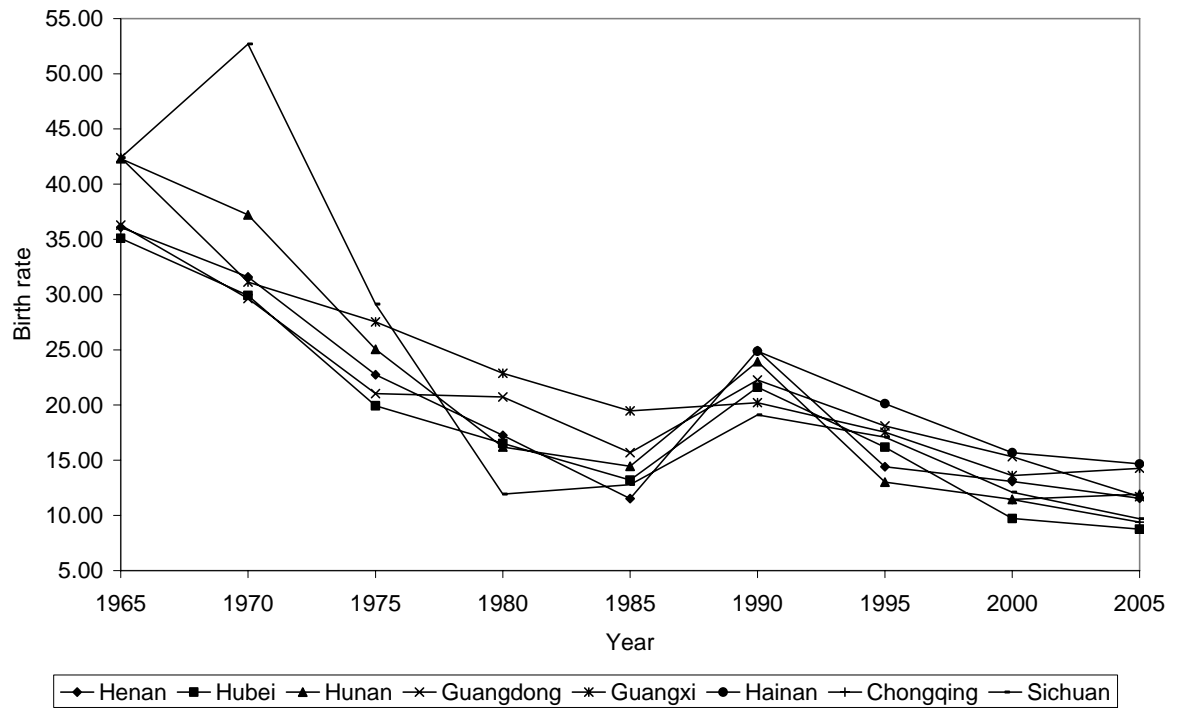


Table 2.3. Projected provincial reference birth rates used for the regional population projections

	2000	2005	2010	2015	2020	2025	2030
Beijing	8.9	8.6	8.4	8.3	8.2	8.1	8.1
Tianjin	10.8	10.5	10.3	10.2	10.2	10.1	10.1
Hebei	12.9	12.4	12.0	11.7	11.5	11.4	11.3
Shanxi	15.3	14.6	14.2	13.9	13.6	13.5	13.3
InnerMongolia	14.3	13.6	13.2	12.8	12.6	12.4	12.3
Liaoning	10.8	10.5	10.3	10.2	10.1	10.1	10.0
Jilin	11.6	11.1	10.7	10.5	10.3	10.2	10.1
Heilongjiang	12.1	11.4	11.0	10.7	10.4	10.3	10.2
Shanghai	8.2	8.1	8.1	8.0	8.0	8.0	8.0
Jiangsu	11.2	10.7	10.5	10.3	10.2	10.1	10.1
Zhejiang	10.9	10.6	10.4	10.2	10.1	10.1	10.1
Anhui	14.3	13.8	13.5	13.3	13.2	13.1	13.1
Fujian	13.8	13.0	12.4	12.0	11.7	11.5	11.3
Jiangxi	16.3	15.4	14.8	14.4	14.0	13.8	13.6
Shandong	11.9	11.5	11.3	11.2	11.1	11.1	11.0
Henan	13.8	13.2	12.8	12.6	12.4	12.3	12.2
Hubei	13.4	12.8	12.3	11.9	11.7	11.5	11.4
Hunan	12.8	12.2	11.8	11.5	11.4	11.2	11.2
Guangdong	15.7	15.0	14.5	14.1	13.8	13.6	13.4
Guangxi	15.5	14.6	13.9	13.4	13.0	12.8	12.6
Hainan	17.5	16.0	15.1	14.6	14.4	14.2	14.1
Chongqing	11.8	11.1	11.0	11.0	11.0	11.0	11.0
Sichuan	14.2	13.5	13.0	12.7	12.4	12.3	12.2
Guizhou	18.9	18.1	17.4	17.0	16.7	16.5	16.4
Yunnan	17.6	16.9	16.4	16.0	15.7	15.5	15.4
Tibet	23.0	23.0	22.7	22.3	22.0	21.7	21.3
Shaanxi	13.9	13.2	12.6	12.2	11.9	11.7	11.5
Gansu	14.7	14.2	13.8	13.5	13.3	13.2	13.1
Qinghai	18.3	17.3	16.7	16.2	15.9	15.6	15.5
Ningxia	17.8	16.8	16.0	15.5	15.1	14.8	14.6
Xinjiang	18.4	17.4	16.6	16.0	15.5	15.2	14.9

Note: The provincial reference birth rate projections are based on data published in NBS (2001) and may differ slightly from the data published in the Statistical Yearbook (NBS, 2002b). The resulting bias is likely to be negligible because it is the relative values that count in the disaggregation procedure.

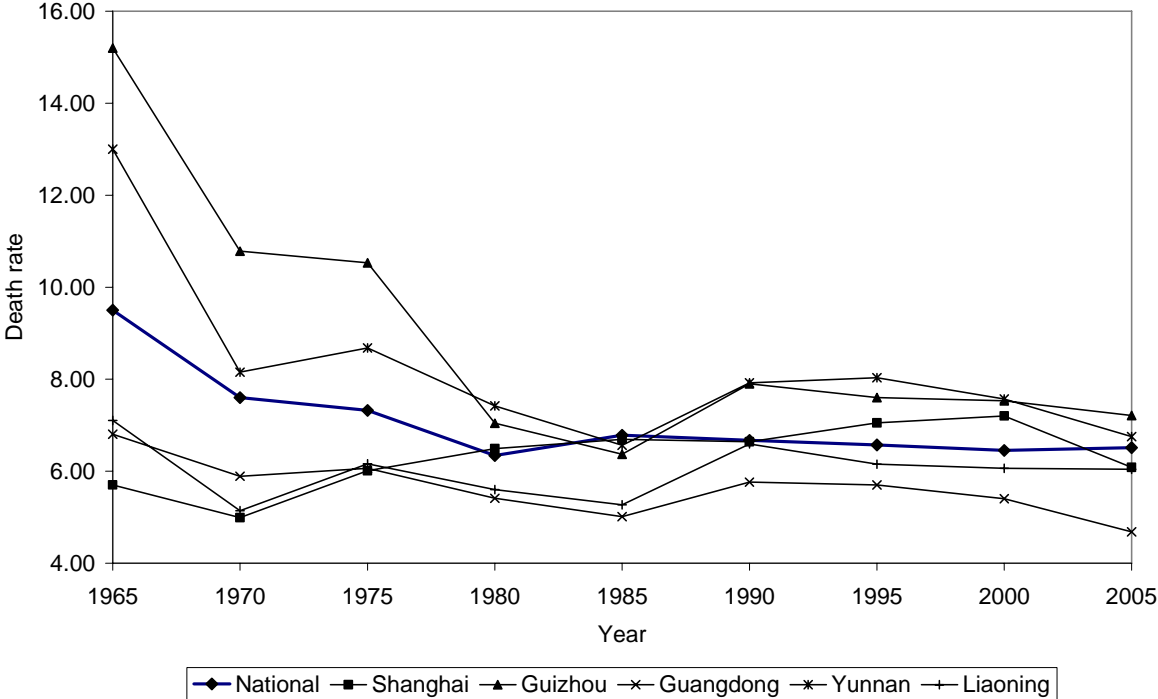
2.4 Provincial death rate projections

In 2005 and beyond, the provincial disaggregation of the nationally projected age groups aged 5+ in rural and urban areas needs to draw on the provincial population structures described by the 2000 census. Keeping the relative size of age groups fixed across provinces, however, might raise some problems. Specifically, it would imply that if province A had 10% more people aged 10-14 than province B in year 2000, then in year 2005, province A will have 10% more people aged 15-19. This would allow downscaling to province level with age detail without actually doing calculations that use different age-specific mortality and migration rates in each region. While computationally convenient, this procedure would result in increasing distortions because it does not account for the differences in provincial mortality and migration rates. This subsection presents the procedure to obtain data for including

differing provincial death rates into the decomposition process. The migration issues are addressed in subsection 2.6.

We adopt a procedure to estimate and forecast provincial reference death rates similar to the one presented above for provincial birth rates. Changes in provincial death rates over the past 35 years are used to estimate a simple statistical model. The parameters from these logistic approximations serve as input parameters for our logistic forecasting model. The initial data screening indicates that the range and variability of provincial death rates are much smaller than those of birth rates. This is illustrated by Figure 2.2 where, in addition to the national data, death rates are presented for selected provinces like the ones with the highest (Yunnan) and lowest (Guangdong not considering Hainan that was part of Guangdong until recently) death rates in 1999 and the highest (Guizhou) and lowest (Shanghai) death rates in 1965, the ones with the largest (Guizhou) and smallest (Liaoning) change between 1965 and 1999.

Figure 2.2 The historical evolution of death rates in selected provinces and at the national level from 1965 to 2005. Source: NBS (2001, 2006). Note: death rates are defined as the number of deaths per 1000 people.



Results of the provincial reference death rate projections are presented in Table 2.4. Considering their relatively (to the birth rates) small variations in the initial year 2000, it is not surprising that provincial differences are projected to decline only modestly in the future.

Table 2.4. Projected provincial reference death rates used for the regional population projections

	2000	2005	2010	2015	2020	2025	2030
Beijing	5.5	5.4	5.3	5.3	5.2	5.2	5.2
Tianjin	6.5	6.6	6.6	6.7	6.8	6.9	7.0
Hebei	6.3	6.2	6.2	6.1	6.1	6.1	6.1
Shanxi	6.1	6.1	6.0	6.0	6.0	6.0	6.0
InnerMongolia	5.9	5.8	5.7	5.6	5.6	5.5	5.4
Liaoning	6.4	6.5	6.6	6.8	6.9	7.0	7.1
Jilin	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Heilongjiang	5.2	5.1	5.1	5.1	5.0	5.0	5.0
Shanghai	7.1	7.4	7.8	8.1	8.5	9.0	9.5
Jiangsu	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Zhejiang	6.2	6.1	6.1	6.1	6.1	6.0	6.0
Anhui	6.4	6.4	6.5	6.5	6.6	6.6	6.7
Fujian	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Jiangxi	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Shandong	6.1	6.1	6.0	6.0	6.0	6.0	6.0
Henan	6.1	6.1	6.0	6.0	6.0	6.0	6.0
Hubei	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Hunan	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Guangdong	5.5	5.4	5.3	5.3	5.2	5.2	5.2
Guangxi	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Hainan	5.7	5.6	5.6	5.5	5.5	5.4	5.4
Chongqing	6.7	6.5	6.4	6.3	6.2	6.2	6.1
Sichuan	6.7	6.5	6.3	6.2	6.2	6.1	6.1
Guizhou	7.1	7.1	7.0	7.0	7.0	7.0	7.0
Yunnan	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Tibet	8.0	7.8	7.6	7.5	7.3	7.2	7.0
Shaanxi	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Gansu	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Qinghai	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Ningxia	5.1	5.1	5.0	5.0	5.0	5.0	5.0
Xinjiang	7.0	7.0	7.0	7.0	7.0	7.0	7.0

Note: The provincial reference birth rate projections are based on data published in NBS (2001) and may differ slightly from the data published in Statistical Yearbook (NBS, 2002b). The resulting bias is likely to be negligible because it is the relative values that count in the disaggregation procedure.

2.5 Provincial urbanization rate projections

The Chinese society has been going through various phases of fast urbanization and anti-urbanization periods over the past half century. Liu et al. (2003) present an in-depth analysis of the characteristics and trends of China's urbanization. They conclude that the urbanization process in China has been heavily regulated and has always been under strict government control. The result of these tight policies is a relatively under-urbanized Chinese society in comparison to other developing countries at a similar stage of socioeconomic development and also compared to the level of industrialization in China. An important component of the government policy has been rural urbanization adopted to limit rural-urban migration to cities.

There are several important implications of the strong government influence on the urbanization process and on rural-urban migration in the past. First, it has suppressed at least

part of the intended migration that would have taken place in the absence of government control. Second, due to the regulation, the complex permit scheme and the difficulties of obtaining permits to change place of residence (“hukou”) resulted in illegal or tolerated migration, a large part of which remained unregistered. The combined implication is that statistical models trying to establish key historical patterns and relationships for use in projecting possible future trends might be somewhat misleading.

Liu et al. (2003) also conduct a thorough statistical analysis of the urbanization process at the national and at the provincial level. They transform the historical data series according to the 2000 definition (the authors call this the “transformation approach”) and apply suitable assumptions about the shares of population with hukou and urban immigrants without hukou. The latter approach is called the “modified transformation” approach and it provides reasonably good statistical fit for most provinces. We use the projections of urbanization levels for the provinces to split the urban population age groups projected by Cao at the national level to provincial age groups. Table 2.5 summarizes the provincial urbanization levels projected by Liu et al. (2003).

Table 2.5 Projections of China's urbanization level at provincial level 2000-2030. Source: Liu et al. (2003) Note: Numbers indicate the percent share of the population living in urban areas of the given province.

	2000	2005	2010	2015	2020	2025	2030
Beijing	76.7	80.0	82.8	85.4	87.6	89.5	91.2
Tianjin	71.8	73.6	75.3	76.9	78.4	79.9	81.3
Hebei	26.4	31.0	36.1	41.4	47.0	52.7	58.3
Shanxi	36.3	41.5	47.0	52.5	58.0	63.3	68.3
Inner-Mongolia	42.2	45.8	49.6	53.3	57.0	60.6	64.1
Liaoning	55.8	59.7	63.5	67.2	70.7	73.9	76.9
Jilin	51.6	56.2	60.7	65.1	69.1	73.0	76.5
Heilongjiang	53.1	56.8	60.4	63.8	67.2	70.4	73.3
Shanghai	87.2	90.2	92.6	94.4	95.8	96.8	97.6
Jiangsu	38.1	46.0	54.1	61.9	69.2	75.6	81.1
Zhejiang	47.4	54.4	61.2	67.6	73.4	78.5	82.8
Anhui	28.9	34.7	40.9	47.5	54.2	60.7	66.9
Fujian	41.7	47.1	52.5	52.5	63.1	68.0	72.6
Jiangxi	28.4	32.4	36.7	41.1	45.7	50.4	55.1
Shandong	41.3	51.7	61.9	71.2	79.0	85.1	89.7
Henan	23.7	28.6	34.1	40.0	46.3	52.6	58.9
Hubei	43.3	50.1	57.0	63.7	69.8	75.3	80.1
Hunan	30.1	35.2	40.7	46.3	52.1	57.8	63.3
Guangdong	58.3	68.2	76.6	83.4	88.5	92.2	94.7
Guangxi	29.9	35.4	41.3	47.4	53.7	59.8	65.6
Hainan	40.7	47.6	53.5	58.2	61.7	64.3	66.1
Chongqing	33.1	38.9	45.1	51.7	58.5	65.2	71.7
Sichuan	28.8	33.8	39.3	45.0	50.8	56.7	62.3
Guizhou	24.4	27.3	30.4	33.7	37.1	40.7	44.4
Yunnan	23.0	26.8	31.1	35.7	40.6	45.7	50.8
Tibet	18.4	19.7	21.1	22.6	24.2	25.8	27.5
Shaanxi	32.4	36.6	41.1	45.7	50.4	55.1	59.7
Gansu	24.8	27.8	31.0	34.5	38.0	41.8	45.6
Qinghai	37.6	41.3	45.1	49.0	52.9	56.7	60.5
Ningxia	34.4	39.5	44.9	50.4	55.8	61.2	66.3
Xinjiang	34.5	37.9	41.4	45.1	48.8	52.5	56.1

2.6 Interprovincial migration projection

Historical data about interprovincial migrations indicate that on average 2.2 million people migrated across provincial boundaries between 1985 and 1990 annually whereas this figure amounts to 2.724 million/year for the period 1990 to 1999. These are the officially registered and statistically recorded migration numbers and as such, are likely to be underestimated.

We have developed a simple model to estimate the provincial share of the national interprovincial migration based on the historical data between 1990 and 2000. The model takes the population of the given province in 1990 and the natural growth rates between 1990 and 1999 for each year. The difference between the calculated population (based on natural growth rates) and the actual population (based on the census data) in 2000 is taken to be the population won or lost due to interprovincial migration. This provides us with the total number of interprovincial migrants as well as the share of each province in the flow of interprovincial migration. These provincial shares are presented in Table 2.6. The numbers

represent a convenient accounting mechanism concerning the net balances of emigrants and immigrants at the province level but do not indicate source-destination relationships. These would require comprehensive migration matrices and are beyond the scope of this study. For our purposes, the provincial distribution of migration balances is sufficient.

Table 2.6 Provincial share in interprovincial migration (in percent).

Region	Share(%)	Region	Share (%)
Beijing	9.1	Hubei	-0.7
Tianjin	2.3	Hunan	-9.1
Hebei	-0.7	Guangdong	51.8
Shanxi	0.9	Guangxi	-10.7
Inner Mongolia	-1.8	Hainan	0.6
Liaoning	-0.9	Chongqing	0.0
Jilin	0.5	Sichuan	-19.1
Heilongjiang	-7.3	Guizhou	-9.8
Shanghai	11.9	Yunnan	0.1
Jiangsu	4.3	Tibet	0.0
Zhejiang	7.4	Shaanxi	-3.8
Anhui	-14.7	Gansu	-0.3
Fujian	3.6	Qinghai	-0.3
Jiangxi	-6.8	Ningxia	0.6
Shandong	1.1	Xinjiang	5.7
Henan	-14.0		

Note: Positive numbers imply net gains and indicate the percent share of the province in the total number of immigrants. Negative numbers imply net losses through interprovincial migration and indicate the share of the province in the total number of emigrants. For example, in any given period, about 9% of all interprovincial migrants go to Beijing, whereas about 9% of all interprovincial migrants stem from Hunan.

For the purposes of the present projections we use an externally defined scenario of interprovincial migration. This scenario assumes the continuation of interprovincial migration of the magnitude observed in the 1990s and in recent years. Accordingly, we assume 15 million interprovincial migrants in any five year period.

It is worth noting that this scenario of interprovincial migration can be easily modified and the disaggregation model can be rerun accordingly. Nevertheless, diverging too far from the value used in this study might undermine the consistency of the magnitudes of interprovincial migration flows with other components of the disaggregation procedure, notably with Cao's assumptions about national-level demographic characteristics and with the provincial urbanization projections by Liu et al. (2003).

3. METHOD: CONCEPT AND PROCEDURE

Considering the objective of this report to produce regionally disaggregated population projections for China and the data sources presented in the previous section, the range of possible methodological deliberations is rather limited. We need a conceptual framework and a computational procedure that make use of the maximum amount of information available from the data sources. In addition, we conduct supplementary analysis of the data available

from the year 2000 census to derive plausible assumptions about the differences in regional demographic patterns for use in the regional decomposition exercise.

3.1 Conceptual framework

Economic disparities in terms of per capita incomes, labor productivity, and economic growth remain significant across provinces in China. This would suggest major differences in demographic patterns across the country as well. Yet, due to the rigorous enforcement of demographic policies over the past few decades, interregional differences in key demographic indicators are considerably smaller than one would expect by looking at the standard development indicators of the provinces. This observation is the first point to guide the conceptual design for our disaggregation exercise.

The above point can be illustrated by the spread of total fertility indicators across the provinces observed in 1989 (Yao, 1995). The extreme low values are observed in two metropolitan regions, Beijing and Shanghai (both with 1.33 total fertility rates), while the extreme high values characterize the sparsely populated regions of Tibet (4.22) and Xinjiang (3.22). Total fertility rates in the majority of the remaining regions range between 1.7 and 2.6. This is still a significant variation around the replacement fertility level. Therefore we need to incorporate additional information in the decomposition procedure.

The case of mortality is similar. Year 2005 and beyond, the provincial disaggregation of the nationally projected age groups aged 5+ in rural and urban areas needs to draw on the provincial population structures described by the 2000 census. This is complemented by additional information from analyzing historical provincial mortality data. By incorporating the results of the provincial death rate projections (see Section 2.4), the procedure accounts for differences in provincial mortality.

Another important observation concerns the differences of demographic indicators between the rural and urban areas in China. This reveals characteristic differences in fertility patterns between urban and rural areas. The study by Yao (1995) finds that for China as a whole, the total fertility rate was just above replacement level at 2.29 in 1989. Although total fertility rates in rural and urban areas have been converging for decades (see Figure 2 in Cao, 2000), this number still hides a considerable difference between 1.59 in urban and 2.58 in rural areas. The multistate population projections by Cao, providing the national-level projections for this study, keep track of this difference by distinguishing rural and urban population groups in terms of fertility and mortality indicators and by applying different assumptions about future convergence of those indicators under different scenarios.

The fourth factor to consider in the long-range population projection is urbanization and rural-urban migration. Despite severe restrictions prevailing in recent decades, migration has become an increasingly important factor in population changes, especially in fast industrializing urban areas in the dynamic coastal regions. With easing regulation, migration is expected to develop into a more significant determinant of population characteristics in many regions than the differences in fertility and mortality rates. The predominant form of migration is short-distance from rural to urban, typically within provincial boundaries. Annual average rates of rural-urban migration in the period 1990-2000 varied across provinces between 0.01 and 0.07%/year. The fastest rates characterize the regions with the lowest rates of urban population in 1990. This is a clear indication of convergence in terms of urbanization

across the provinces and it is expected to continue in the future. Yet the present levels and the future rates of urbanization differ significantly across provinces. These differences need to be accounted for in the disaggregation procedure.

We can conclude from the above considerations that it is a sensible approximation to use a differentiated regional decomposition of the national population projections according to the year 2000 provincial and rural-urban distribution and on the basis of additional information concerning persistent long-term trends in birth-rate, death-rate, and urbanization-rate differences across the provinces. The next task is to find the procedure that integrates the maximum amount of information available from the data sources in a consistent manner.

3.2 The decomposition procedure

The main source of the regional population projections discussed here is the new series of projections produced by Cao (2008). For each projection (scenario), the multi-state projection model adopted by her produces detailed projection tables that contain five-year age groups for male and female populations in rural and urban areas according to the 2000 classification. These tables are created in five-year time steps over the period 2000 to 2030.

The first task is to harmonize Cao's age group population numbers in the rural and urban categories with those in the year 2000 census. We use the ratio of Cao's age group population and the census figure to define a multiplier. This correction multiplier is then applied to the provincial age group population figures in the census so that the sum of the adjusted population exactly matches Cao's figures in each age group. The result is a set of rescaled provincial population tables (rural, urban, total population) that matches Cao's national total figures.

$$(1) \quad p_{i,j,k}^{u/r} = c_{i,j}^{u/r} * \frac{s_{j,k}^{u/r}}{\sum_i c_{i,j}^{u/r}} \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2000$$

where: $p_{i,j,k}^{u/r}$ = adjusted urban/rural population in province i, age group j, year k

$c_{i,j}^{u/r}$ = census-based urban/rural population in province i, age group j

$s_{j,k}^{u/r}$ = scenario-based national urban/rural population in age group j, year k

After the adjustments for the year 2000, the disaggregation procedure consists of the following steps for each five-year period between 2005 and 2030.

We use the projected provincial reference birth rates to produce a preliminary provincial total population for the '0-4' age group. The sum of these approximate numbers would usually not match the national total projected by Cao. Therefore a correction multiplier is defined as a ratio of Cao's projected age group population and the estimated age group population based on the projected provincial birth rates. The provincial numbers are then adjusted so that their sum will match Cao's national total figures.

$$(2) \quad \bar{p}_{i,1,k}^t = b_{i,k-5} * \sum_{j=1}^{17} p_{i,j,k-5}^t * \frac{s_{1,k}^t}{\sum_i b_{i,k-5} * \sum_{j=1}^{17} p_{i,j,k-5}^t} \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2005, \dots, 2030$$

where: $\bar{p}_{i,1,k}^t$ = total population in province i, age group 0-4, year k

$b_{i,k-5}$ = projected reference birth rate in province i, year k-5

$s_{1,k}^t$ = total projected national population in age group 0-4, year k

For all other age groups, we take the provincial total population number of the same age group in the previous (5 year earlier) period, account for the provincial reference death rate projected for the given period, and compare the outcome to Cao's projected national total population in that age group. We then readjust the provincial total populations in each age group to match the projected national population figures.

$$(3) \quad \bar{p}_{i,j,k}^t = (1 - d_{i,k}) * p_{i,j-1,k-5}^t * \frac{s_{j,k}^t}{\sum_i p_{i,j-1,k-5}^t} \quad i = 1, \dots, 31; j = 2, \dots, 17; k = 2005, \dots, 2030$$

where: $d_{i,k}$ = projected reference death rate in province i, year k

$\bar{p}_{i,j,k}^t$ = total population in province i, age group j, year k

$s_{j,k}^t$ = total projected national population in age group j, year k

Interprovincial migration is treated as an external scenario. The total number of interprovincial migrants can be specified for each time step. The share of each age group in the total number of migrants is defined according to the age group distribution of rural-urban migration used by Cao in the national projections. These migrants are then distributed across the provinces according to the provincial shares in the national interprovincial migration. Just as in the past, some provinces lose, other provinces gain people from interprovincial migration.

$$(4) \quad p_{i,j,k}^t = \bar{p}_{i,j,k}^t + a_j * i_k * h_i \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2005, \dots, 2030$$

where: $p_{i,j,k}^t$ = total population after interprovincial migration in province i, age group j, year k

$\bar{p}_{i,j,k}^t$ = total population before interprovincial migration in province i, age group j, year k

$i_k^{u/r}$ = number of interprovincial migrants in year k

h_i = share of province i in the interprovincial migration

a_j = share of age group j in the interprovincial migration

The next step is to split the provincial population into rural and urban populations. We use the results of the urbanization rate forecasts by Liu et al. (2003) for the provinces as reference to produce preliminary provincial urban population figures for each age group. Due to the general upward bias in the projected provincial urbanization rates produced by Liu et al.

(2003), the procedure involves the use urbanization rates of each age group in each province in the previous time step and the distribution of the additional urban population according to the relative growth rates in provincial urbanization projected by Liu et al. (2003) in the given time period. We then use Cao's projected national urban population figures to adjust the provincial urban numbers so that the provincial totals match the national figures for each age group. The core of this procedure is as follows:

$$(5) \quad p_{i,j,k}^u = p_{i,j,k}^t * u_{i,k} * \frac{s_{j,k}^u}{\sum_i p_{i,j,k}^t * u_{i,k}} \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2005, \dots, 2030$$

where: $p_{i,j,k}^u$ = urban population in province i, age group j, year k

$p_{i,j,k}^t$ = total population in province i, age group j, year k

$u_{i,k}$ = forecasted reference urbanization rate in province i, year k

$s_{j,k}^u$ = total projected national urban population in age group j, year k

The rural population numbers for each age group and province are calculated by subtracting the urban population from the corresponding total population figures.

$$(6) \quad p_{i,j,k}^r = p_{i,j,k}^t - p_{i,j,k}^u \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2005, \dots, 2030$$

where: $p_{i,j,k}^{r/u/t}$ = rural/urban/total population in province i, age group j, year k

These three sets of numbers constitute the starting values for the disaggregation procedure in the next period (Equation 2). The above procedure from Equations 2 through 6 is repeated for each five-year time step over the projection horizon. The same procedure is used for all scenarios.

Finally, the aggregation step involves combining the modified tables into three larger population age groups in the rural and urban categories and for total populations as follows:

$$(7) \quad p_{i,g,k}^{u/r/t} = \sum_j p_{i,j,k}^{u/r/t}$$

where: $p_{i,j,k}^{u/r/t}$ = urban/rural/total population age group in province i, age group j, year k

and the larger age groups: g=1: 0-14 (j=1-3); g=2: 15-64 (j=4-13), g=3: 65+ (j=14-17)

Summing up the five-year age groups into the three larger age groups is practical because these three age clusters represent the typical active-age versus dependent population groups that are of primary concern in most socioeconomic studies. Accordingly, this is the resolution adopted for presenting the results of our disaggregation procedure in this report.

In an additional (optional) step, projected population numbers for the 31 provinces are added up according to the economic regions defined for the IIASA LUC study and models. Obviously, any regional aggregation can be easily produced from the province-level projections.

The computer implementation of this disaggregation procedure takes the form of a FORTRAN code. It is formulated according to the specific disaggregation task and the given data structure. However, it is easy to rerun the code with different national-level demographic scenarios, modified or re-estimated provincial birth-rate, death-rate, or migration-rate projections, alternative assumptions about the magnitude, dynamics, and regional distribution of interprovincial migration flows. Yet such changes need to be internally consistent. Moreover, the time horizon can also be extended up to 2050, but in this case all scenario-type input files must be expanded to include input data for the additional five-year periods. The computer implementation is simple: the user needs to replace the particular input file(s) with the one(s) containing the modified data. The model runs in about a second on any suitable PC or workstation platform.

4. RESULTS

The numerical results of this study are available at three levels of aggregation. The most aggregated results are presented in this section: rural and urban populations in the three large age groups in the 8 LUC regions and their national totals. For those, who are interested in province-level details, rural and urban populations in the same three large age groups are presented in the Appendix. Finally, the full-size output files (31 provinces, 17 age groups, 7 time steps from 2000 to 2030) for all four scenarios are available from the authors.

This section presents the regional population projections obtained by using the procedure outlined in Section 3 to a number of nation-wide projections prepared by Cao (2008). The series of tables for each scenario present projected population levels in the three large age groups for urban and rural areas as well as totals for age groups and LUC-regions. The tables are also available in electronic form as Excel spreadsheets for easy integration into the input data set of any model.

4.1 Scenario MM

This regional projection is based on Cao's MM scenario. The underlying assumptions are presented in Table 4.1.

Table 4.1 Main characteristics of the Medium-MM scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.28	1.26	1.95	1.83
<i>Life expectancy</i>				
Male	73.50	75.25	68.89	71.31
Female	77.39	80.97	72.09	75.45
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	281.293		-281.293	

Table 4.2 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight LUC regions.

Table 4.2 Population projection for China and the LUC-regions under the Medium scenario assumptions for the period 2000-2030 (1000 people).

MEDIUM PROJECTION -- MM										
China										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84510	344796	29465	220831	525015	58809	458771	804655	1263426	36.31
2005	82256	409362	36436	181353	532257	63939	528054	777550	1305604	40.45
2010	91735	463124	42690	157098	518914	69261	597549	745272	1342822	44.50
2015	105796	505288	52845	144766	486411	80624	663929	711801	1375731	48.26
2020	111009	542816	69389	129628	442697	98992	723214	671317	1394531	51.86
2025	109771	579906	85751	113072	402143	107794	775427	623009	1398436	55.45
2030	107610	605362	109845	93547	349882	126067	822816	569497	1392313	59.10
North										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19175	76495	6646	55146	135362	15871	102316	206379	308695	33.14
2005	18065	92796	8399	42190	139578	16678	119260	198446	317706	37.54
2010	20748	105499	9884	37242	134463	17734	136130	189439	325569	41.81
2015	23760	115924	12301	33856	125404	21103	151985	180362	332348	45.73
2020	25005	124629	16392	30309	112775	26618	166026	169702	335728	49.45
2025	24740	133131	20452	26409	101340	29665	178323	157415	335738	53.11
2030	24258	139238	25844	21810	87491	34676	189341	143977	333318	56.80
Northeast										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8926	42245	3778	11395	36377	3155	54949	50927	105876	51.90
2005	7867	46488	4845	9172	35620	3547	59200	48339	107539	55.05
2010	8275	49153	5573	8126	33415	3969	63001	45510	108511	58.06
2015	9349	50096	6684	7698	29979	5016	66129	42693	108822	60.77
2020	9364	50033	8954	6688	26065	6781	68351	39534	107885	63.36
2025	8900	49313	11452	5657	22171	7998	69665	35826	105491	66.04
2030	8339	47662	14456	4485	17957	9315	70458	31756	102214	68.93
East										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	14029	62830	6615	28234	74948	10302	83475	113484	196959	42.38
2005	13386	73410	7458	22745	73995	10698	94254	107437	201692	46.73
2010	14481	81834	8391	18675	71021	11230	104705	100926	205631	50.92
2015	16609	87535	10351	17213	64440	12806	114495	94460	208955	54.79
2020	17238	92183	13451	15142	56871	15312	122872	87326	210198	58.46
2025	16844	96692	16460	13034	50651	15871	129996	79556	209552	62.04
2030	16259	99056	20667	10608	42295	18345	135982	71249	207231	65.62

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10311	39293	3067	30398	74776	8010	52672	113184	165855	31.76
2005	9841	46685	3879	23803	75729	8905	60405	108436	168841	35.78
2010	10967	52334	4610	20513	72897	9465	67911	102875	170786	39.76
2015	12806	56008	5917	19216	67109	10953	74730	97278	172008	43.45
2020	13149	59469	7741	16895	60772	13186	80359	90853	171211	46.94
2025	12702	62764	9408	14454	54583	14450	84874	83486	168360	50.41
2030	12158	64331	12141	11722	46619	17321	88630	75662	164292	53.95

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12405	49048	3361	20043	39316	4688	64814	64046	128860	50.30
2005	12873	61583	4013	18110	41958	4887	78469	64955	143424	54.71
2010	14209	74188	4667	15940	44267	5055	93064	65262	158326	58.78
2015	16826	85398	5855	15560	44262	5601	108079	65423	173502	62.29
2020	18409	96776	7788	14683	43073	6900	122974	64655	187628	65.54
2025	19079	108577	10121	13491	41036	8077	137778	62605	200383	68.76
2030	19617	119285	13994	11733	37904	9864	152895	59501	212396	71.99

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12190	46825	4090	51543	112559	12471	63104	176573	239678	26.33
2005	12674	55055	5083	44891	111569	13955	72812	170415	243226	29.94
2010	14548	61893	6124	39043	108395	15692	82565	163130	245695	33.60
2015	16475	67865	7520	34587	102751	17813	91859	155150	247010	37.19
2020	17267	73046	9688	30684	93644	21206	100000	145534	245534	40.73
2025	16944	78619	11208	26501	86132	21596	106772	134229	241000	44.30
2030	16504	81782	14072	21758	75759	24470	112359	121987	234346	47.95

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	426	1554	88	1894	3430	257	2068	5581	7649	27.03
2005	467	1862	136	1811	3547	314	2465	5672	8137	30.29
2010	558	2165	176	1683	3663	370	2899	5716	8615	33.65
2015	672	2469	213	1609	3702	429	3354	5740	9094	36.88
2020	744	2790	266	1525	3655	494	3800	5674	9474	40.11
2025	770	3139	321	1394	3587	533	4230	5514	9744	43.41
2030	793	3429	442	1215	3411	663	4664	5289	9952	46.86

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7047	26506	1820	22178	48247	4056	35373	74481	109854	32.20
2005	7083	31484	2622	18631	50262	4955	41189	73849	115038	35.80
2010	7950	36057	3266	15876	50793	5745	47274	72414	119688	39.50
2015	9299	39994	4004	15028	48765	6902	53298	70695	123993	42.98
2020	9833	43890	5109	13702	45842	8495	58832	68039	126872	46.37
2025	9791	47671	6328	12131	42642	9604	63790	64378	128168	49.77
2030	9682	50578	8228	10215	38446	11414	68488	60075	128563	53.27

4.2 Scenario Low

This regional projection is based on Cao's Low scenario. It is based on the following assumptions (see Table 4.3).

Table 4.3 Main characteristics of the Low scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.28	1.10	1.95	1.70
<i>Life expectancy</i>				
Male	73.50	75.25	68.89	71.31
Female	77.39	80.97	72.09	75.45
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	318.555		-318.555	

Table 4.4 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight LUC regions.

Table 4.4 Population projection for China and the LUC-regions under the Low scenario assumptions for the period 2000-2030 (1000 people).

LOW PROJECTION										
China										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84510	344796	29465	220831	525015	58809	458771	804655	1263426	36.31
2005	82256	409362	36436	181353	532257	63939	528054	777550	1305604	40.45
2010	91129	465475	42721	156128	516563	69229	599325	741920	1341246	44.68
2015	104187	512304	52952	141580	479419	80519	669444	701518	1370962	48.83
2020	108176	556758	69631	123009	428809	98758	734565	650576	1385141	53.03
2025	106356	602046	86211	102771	378557	107357	794613	588685	1383298	57.44
2030	103690	637109	110653	79516	313586	125310	851451	518412	1369864	62.16

North										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19175	76495	6646	55146	135362	15871	102316	206379	308695	33.14
2005	18065	92796	8399	42190	139578	16678	119260	198446	317706	37.54
2010	20613	106093	9891	37014	133869	17726	136598	188609	325207	42.00
2015	23403	117639	12329	33111	123694	21076	153371	177882	331253	46.30
2020	24384	128031	16455	28762	109386	26557	168870	164705	333576	50.62
2025	24009	138366	20573	24003	95771	29550	182948	149325	332273	55.06
2030	23435	146644	26054	18539	79038	34479	196132	132056	328188	59.76

Northeast										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8926	42245	3778	11395	36377	3155	54949	50927	105876	51.90
2005	7867	46488	4845	9172	35620	3547	59200	48339	107539	55.05
2010	8218	49317	5576	8074	33251	3967	63110	45292	108403	58.22
2015	9197	50561	6693	7525	29516	5008	66451	42048	108499	61.25
2020	9091	50920	8976	6329	25182	6760	68987	38272	107259	64.32
2025	8559	50666	11497	5101	20718	7955	70723	33774	104496	67.68
2030	7940	49531	14535	3736	15779	9241	72006	28756	100762	71.46

East										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	14029	62830	6615	28234	74948	10302	83475	113484	196959	42.38
2005	13386	73410	7458	22745	73995	10698	94254	107437	201692	46.73
2010	14385	82169	8396	18559	70687	11225	104950	100470	205420	51.09
2015	16354	88515	10369	16829	63463	12788	115238	93081	208319	55.32
2020	16769	94069	13492	14357	54993	15272	124330	84623	208953	59.50
2025	16245	99625	16537	11824	47527	15798	132407	75149	207556	63.79
2030	15544	103144	20801	8971	37607	18220	139488	64798	204286	68.28

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10311	39293	3067	30398	74776	8010	52672	113184	165855	31.76
2005	9841	46685	3879	23803	75729	8905	60405	108436	168841	35.78
2010	10891	52637	4614	20383	72594	9461	68142	102439	170581	39.95
2015	12613	56890	5931	18794	66230	10940	75433	95964	171397	44.01
2020	12818	61168	7771	16033	59079	13157	81757	88269	170027	48.09
2025	12319	65408	9465	13141	51752	14396	87192	79289	166480	52.37
2030	11733	68030	12243	9976	42341	17226	92006	69543	161549	56.95

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12405	49048	3361	20043	39316	4688	64814	64046	128860	50.30
2005	12873	61583	4013	18110	41958	4887	78469	64955	143424	54.71
2010	14115	74504	4669	15842	43950	5053	93289	64845	158134	58.99
2015	16558	86405	5864	15217	43259	5592	108827	64068	172895	62.94
2020	17912	98901	7809	13923	40956	6880	124621	61759	186380	66.86
2025	18425	112202	10164	12222	37236	8036	140792	57494	198286	71.00
2030	18808	124848	14075	9877	31758	9788	157731	51423	209154	75.41

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12190	46825	4090	51543	112559	12471	63104	176573	239678	26.33
2005	12674	55055	5083	44891	111569	13955	72812	170415	243226	29.94
2010	14456	62307	6130	38806	107981	15686	82893	162473	245366	33.78
2015	16241	69132	7540	33831	101487	17793	92913	153111	246024	37.77
2020	16881	75568	9733	29140	91130	21162	102182	141433	243615	41.94
2025	16534	82639	11286	24152	81807	21522	110460	127481	237941	46.42
2030	16080	87477	14206	18633	69124	24345	117762	112101	229864	51.23

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	426	1554	88	1894	3430	257	2068	5581	7649	27.03
2005	467	1862	136	1811	3547	314	2465	5672	8137	30.29
2010	555	2180	176	1673	3648	369	2910	5690	8601	33.84
2015	662	2517	213	1573	3655	428	3392	5656	9048	37.49
2020	728	2890	267	1449	3556	493	3885	5498	9382	41.40
2025	752	3309	323	1273	3404	531	4385	5207	9592	45.71
2030	775	3688	446	1046	3109	659	4909	4814	9723	50.49

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7047	26506	1820	22178	48247	4056	35373	74481	109854	32.20
2005	7083	31484	2622	18631	50262	4955	41189	73849	115038	35.80
2010	7896	36268	3269	15777	50582	5743	47433	72102	119535	39.68
2015	9159	40646	4013	14700	48115	6894	53818	69708	123527	43.57
2020	9592	45211	5128	13014	44526	8477	59931	66018	125949	47.58
2025	9512	49830	6366	11055	40342	9568	65708	60966	126673	51.87
2030	9375	53747	8295	8738	34831	11352	71416	54921	126338	56.53

4.3 Scenario High

This regional projection is based on Cao's High scenario. It is based on the following assumptions (see Table 4.5).

Table 4.5 Main characteristics of the High scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.28	1.35	1.95	2.08
<i>Life expectancy</i>				
Male	73.50	75.25	68.89	71.31
Female	77.39	80.97	72.09	75.45
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	248.770		-248.770	

Table 4.6 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight LUC regions.

Table 4.6 Population projection for China and the LUC-regions under the High scenario assumptions for the period 2000-2030 (1000 people).

HIGH PROJECTION										
China										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84510	344796	29465	220831	525015	58809	458771	804655	1263426	36.31
2005	82256	409362	36436	181353	532257	63939	528054	777550	1305604	40.45
2010	91926	460772	42659	158720	521265	69292	595357	749277	1344634	44.28
2015	106218	498507	52741	149882	493169	80726	657466	723776	1381243	47.60
2020	111470	529786	69160	139819	455674	99211	710416	694704	1405121	50.56
2025	109534	559567	85327	128159	424154	108196	754428	660508	1414936	53.32
2030	106431	576700	109116	113219	383815	126749	792248	623782	1416030	55.95

North										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19175	76495	6646	55146	135362	15871	102316	206379	308695	33.14
2005	18065	92796	8399	42190	139578	16678	119260	198446	317706	37.54
2010	20782	104905	9876	37625	135057	17742	135562	190424	325986	41.59
2015	23832	114243	12275	35055	127079	21129	150350	183263	333613	45.07
2020	25063	121438	16333	32692	115953	26675	162834	175321	338155	48.15
2025	24603	128220	20340	29941	106636	29771	173164	166349	339513	51.00
2030	23877	132495	25655	26405	95450	34852	182027	156708	338735	53.74

Northeast										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8926	42245	3778	11395	36377	3155	54949	50927	105876	51.90
2005	7867	46488	4845	9172	35620	3547	59200	48339	107539	55.05
2010	8308	48989	5571	8218	33579	3972	62868	45768	108636	57.87
2015	9435	49648	6675	7988	30425	5025	65758	43437	109195	60.22
2020	9502	49204	8934	7261	26890	6800	67640	40951	108591	62.29
2025	9028	48076	11411	6500	23523	8037	68515	38060	106575	64.29
2030	8433	45986	14385	5570	19993	9381	68804	34943	103747	66.32

East										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	14029	62830	6615	28234	74948	10302	83475	113484	196959	42.38
2005	13386	73410	7458	22745	73995	10698	94254	107437	201692	46.73
2010	14521	81499	8385	18878	71356	11236	104405	101469	205875	50.71
2015	16708	86590	10333	17853	65382	12824	113631	96059	209690	54.19
2020	17382	90420	13411	16412	58626	15350	121213	90389	211601	57.28
2025	16978	94011	16389	14856	53553	15938	127379	84348	211726	60.16
2030	16333	95367	20547	12952	46681	18458	132246	78091	210337	62.87

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10311	39293	3067	30398	74776	8010	52672	113184	165855	31.76
2005	9841	46685	3879	23803	75729	8905	60405	108436	168841	35.78
2010	10989	52031	4606	20727	73200	9469	67626	103397	171023	39.54
2015	12846	55160	5904	19885	67954	10966	73910	98805	172715	42.79
2020	13183	57882	7712	18204	62352	13213	78778	93770	172548	45.66
2025	12634	60350	9355	16359	57214	14500	82339	88073	170412	48.32
2030	11966	60996	12050	14152	50625	17407	85011	82184	167195	50.85

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12405	49048	3361	20043	39316	4688	64814	64046	128860	50.30
2005	12873	61583	4013	18110	41958	4887	78469	64955	143424	54.71
2010	14256	73871	4664	16114	44583	5058	92791	65755	158546	58.53
2015	16950	84427	5847	16141	45230	5609	107224	66980	174203	61.55
2020	18604	94790	7769	15904	45051	6918	121162	67872	189035	64.10
2025	19225	105265	10082	15423	44552	8115	134572	68090	202661	66.40
2030	19661	114278	13921	14426	43586	9933	147860	67945	215805	68.52

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12190	46825	4090	51543	112559	12471	63104	176573	239678	26.33
2005	12674	55055	5083	44891	111569	13955	72812	170415	243226	29.94
2010	14548	61479	6117	39422	108809	15698	82145	163929	246073	33.38
2015	16451	66647	7500	35755	103964	17832	90597	157552	248149	36.51
2020	17153	70696	9645	32975	95985	21247	97494	150206	247700	39.36
2025	16603	74955	11137	29838	90147	21664	102694	141649	244343	42.03
2030	15914	76651	13952	26020	81979	24582	106518	132581	239099	44.55

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	426	1554	88	1894	3430	257	2068	5581	7649	27.03
2005	467	1862	136	1811	3547	314	2465	5672	8137	30.29
2010	558	2150	176	1700	3678	370	2884	5747	8632	33.42
2015	671	2423	212	1663	3747	429	3306	5840	9146	36.15
2020	737	2697	265	1635	3748	495	3699	5878	9578	38.62
2025	751	2984	320	1563	3758	534	4055	5855	9909	40.92
2030	760	3196	439	1442	3693	666	4395	5801	10196	43.10

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7047	26506	1820	22178	48247	4056	35373	74481	109854	32.20
2005	7083	31484	2622	18631	50262	4955	41189	73849	115038	35.80
2010	7964	35847	3264	16038	51003	5748	47075	72789	119864	39.27
2015	9326	39369	3996	15543	49388	6910	52691	71841	124532	42.31
2020	9846	42659	5091	14735	47069	8513	57596	70316	127913	45.03
2025	9712	45706	6294	13678	44771	9637	61712	68086	129797	47.54
2030	9486	47732	8168	12251	41808	11471	65386	65529	130915	49.95

4.4 Scenario High2

This regional projection is based on Cao's High2 scenario (higher urban fertility). It is based on the following assumptions (see Table 4.7).

Table 4.7 Main characteristics of the High2 scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.28	1.54	1.95	2.08
<i>Life expectancy</i>				
Male	73.50	75.25	68.89	71.31
Female	77.39	80.97	72.09	75.45
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	248.770		-248.770	

Table 4.8 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight LUC regions.

Table 4.8 Population projection for China and the LUC-regions under the High2 scenario assumptions for the period 2000-2030 (1000 people).

HIGH2 PROJECTION										
China										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84510	344796	29465	220831	525015	58809	458771	804655	1263426	36.31
2005	82256	409362	36436	181353	532257	63939	528054	777550	1305604	40.45
2010	92446	460772	42659	158720	521265	69292	595878	749277	1345155	44.30
2015	108018	498507	52741	149882	493169	80726	659266	723776	1383043	47.67
2020	115511	529786	69160	139819	455674	99211	714458	694704	1409162	50.70
2025	116303	560082	85327	128159	424154	108196	761712	660508	1422221	53.56
2030	116569	578486	109116	113219	383815	126749	804171	623782	1427953	56.32

North										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19175	76495	6646	55146	135362	15871	102316	206379	308695	33.14
2005	18065	92796	8399	42190	139578	16678	119260	198446	317706	37.54
2010	20903	104905	9876	37623	135057	17742	135683	190423	326106	41.61
2015	24248	114243	12275	35052	127079	21129	150766	183260	334026	45.14
2020	25994	121438	16333	32687	115953	26675	163765	175316	339081	48.30
2025	26165	128340	20340	29927	106635	29771	174845	166334	341179	51.25
2030	26205	132911	25655	26388	95445	34852	184772	156685	341458	54.11

Northeast										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8926	42245	3778	11395	36377	3155	54949	50927	105876	51.90
2005	7867	46488	4845	9172	35620	3547	59200	48339	107539	55.05
2010	8347	48989	5571	8215	33579	3972	62907	45765	108672	57.89
2015	9567	49648	6675	7977	30425	5025	65890	43427	109317	60.27
2020	9795	49204	8934	7237	26890	6800	67933	40927	108860	62.40
2025	9512	48114	11411	6458	23520	8037	69037	38016	107052	64.49
2030	9143	46116	14385	5506	19984	9381	69643	34872	104515	66.63

East										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	14029	62830	6615	28234	74948	10302	83475	113484	196959	42.38
2005	13386	73410	7458	22745	73995	10698	94254	107437	201692	46.73
2010	14596	81499	8385	18872	71356	11236	104481	101464	205944	50.73
2015	16967	86590	10333	17834	65382	12824	113890	96040	209930	54.25
2020	17960	90420	13411	16370	58626	15350	121791	90346	212138	57.41
2025	17910	94084	16389	14817	53549	15938	128383	84304	212687	60.36
2030	17714	95615	20547	12898	46670	18458	133875	78026	211901	63.18

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10311	39293	3067	30398	74776	8010	52672	113184	165855	31.76
2005	9841	46685	3879	23803	75729	8905	60405	108436	168841	35.78
2010	11055	52031	4606	20729	73200	9469	67692	103398	171091	39.57
2015	13071	55160	5904	19891	67954	10966	74135	98811	172945	42.87
2020	13679	57882	7712	18218	62352	13213	79273	93783	173057	45.81
2025	13450	60413	9355	16378	57217	14500	83219	88095	171313	48.58
2030	13161	61212	12050	14181	50635	17407	86422	82223	168645	51.25

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12405	49048	3361	20043	39316	4688	64814	64046	128860	50.30
2005	12873	61583	4013	18110	41958	4887	78469	64955	143424	54.71
2010	14325	73871	4664	16108	44583	5058	92861	65749	158609	58.55
2015	17203	84427	5847	16118	45230	5609	107476	66957	174433	61.61
2020	19199	94790	7769	15848	45051	6918	121758	67817	189575	64.23
2025	20281	105341	10082	15321	44539	8115	135704	67975	203679	66.63
2030	21334	114556	13921	14266	43540	9933	149810	67738	217548	68.86

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12190	46825	4090	51543	112559	12471	63104	176573	239678	26.33
2005	12674	55055	5083	44891	111569	13955	72812	170415	243226	29.94
2010	14646	61479	6117	39432	108809	15698	82243	163939	246182	33.41
2015	16785	66647	7500	35792	103964	17832	90932	157589	248520	36.59
2020	17892	70696	9645	33059	95985	21247	98233	150291	248524	39.53
2025	17828	75048	11137	29973	90161	21664	104012	141797	245810	42.31
2030	17716	76968	13952	26223	82028	24582	108636	132833	241469	44.99

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	426	1554	88	1894	3430	257	2068	5581	7649	27.03
2005	467	1862	136	1811	3547	314	2465	5672	8137	30.29
2010	562	2150	176	1701	3678	370	2888	5748	8637	33.44
2015	685	2423	212	1666	3747	429	3321	5842	9163	36.24
2020	770	2697	265	1642	3748	495	3732	5885	9617	38.81
2025	808	2988	320	1574	3758	534	4116	5866	9983	41.23
2030	849	3210	439	1459	3696	666	4498	5821	10319	43.59

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7047	26506	1820	22178	48247	4056	35373	74481	109854	32.20
2005	7083	31484	2622	18631	50262	4955	41189	73849	115038	35.80
2010	8012	35847	3264	16041	51003	5748	47123	72791	119915	39.30
2015	9492	39369	3996	15553	49388	6910	52857	71851	124708	42.38
2020	10222	42659	5091	14757	47069	8513	57971	70339	128310	45.18
2025	10349	45753	6294	13711	44773	9637	62396	68121	130517	47.81
2030	10448	47898	8168	12298	41816	11471	66513	65584	132098	50.35

5. DISCUSSION

Earlier sections in this report raise and discuss potential imprecision and errors of the regional population projections. The sources of imprecision can be classified into three main categories: general projection errors, data sources, and procedures.

The multistate population projection method adopted by Cao to produce the national-level projections is a widely accepted and used method in demography. It requires that assumptions underlying the projections are clearly specified, thereby making their implications clear and the results transparent. Yet this does not eliminate the risk of usual projection errors. Demographic behavior and relationships observed in the past and incorporated in the projection model as parameters can change in the future, sometimes surprisingly. One possible source of surprise in the case of China could be a major fertility revival if prevailing demographic policies or their enforcement relax before incomes in China reach the level at which the low-fertility effects of affluence observed in most developed countries become dominant. The period of over two decades of strict population policies has certainly produced a durable impact on the social culture and attitudes towards fertility that makes the return to high-fertility levels rather unlikely. Nevertheless, the only remedy to this problem is to develop a set of assumptions that covers a sufficiently broad range and thus produces a wide but plausible range of projections. Cao's national-level assumptions attempt to fulfill this principle, but the span of projections in terms of total population in 2020 or 2030 is still relatively narrow.

The regional disaggregation procedure draws on additional information in order to reduce the magnitude of possible errors. Provincial birth rate projections (based on long-term historical trends) are used to account for differences in fertility patterns. Provincial death rate projections (also based on historical data) are applied to observe the effect of varying life expectancy across the provinces. Provincial urbanization rate projections (based on rigorous statistical analysis of past trends) are adopted to incorporate the differences in rates and levels of urbanization. Finally, historically observed patterns of interprovincial migration are also reflected in the disaggregation model.

The combination of multi-state demographic projection method with the 2000 census data for preparing the national-level projections by Cao (2008), and the additional information on provincial birth rates, death rates, and urbanization rates incorporated in the disaggregation model also based on the 2000 census provide detailed long-term province-level demographic scenarios that might be useful for regional studies of the Chinese economy and society.

6. SUMMARY AND CONCLUSIONS: POTENTIAL USES OF THE REGIONAL PROJECTIONS

As indicated in earlier sections of this report, the demographic parameters driving the multi-state national projections (Cao, 2008) are not tied to specific assumptions about overall economic development. Instead, they are based on observations of historical patterns of demographic processes and extended into the future by assuming continuing trends without significant disruptions. These assumptions are perfectly sensible from the demographer's

perspective and the resulting scenarios cover a reasonably broad range of possible population futures. However, the use of the population projections in socioeconomic studies requires the harmonization of the assumptions behind the different development scenarios and the population scenarios. Recent population-development relationships in China and lessons from such studies in other countries might provide the clues for linking selected population projections to specific development scenarios. The key issues to consider are the following: what rates and patterns of economic growth are most compatible with the high or low fertility scenarios and migration rates, slow or fast convergence of fertility patterns across rural-urban groups and different education categories.

The use of regional population projections in development studies makes the careful coupling of national-scale demographic scenarios and macroeconomic projections even more important. Here again, past observations and common sense can be helpful in making the relevant linkages. High rates of economic development are likely to require more labor and provide greater employment opportunities in the industrial and service sectors, hence such socioeconomic scenarios are more likely to be consistent with demographic scenarios incorporating with fast urbanization and high rates of rural-urban migration.

A possible practical approach to using the population scenarios presented here is to select the most relevant assumptions for a particular application and take the corresponding regional population projection as the baseline. Subsequently, one can make additional changes to the baseline population projection on the basis of the internal dynamics of the particular socioeconomic scenario or model run. This could be taken to the point where the emerging population story is a mixture of an external demographic scenario and a semi-endogenized feed-back process. Typically, interprovincial migration flows could be generated on the basis of the emerging regional dynamics of a relevant multi-regional economic model. These migration flows could then be superimposed on the underlying population projection to keep track of the relevant changes in dependency ratios, labor force availability, etc.

There is no categorically proper way to produce long-term regional population projections. The procedure developed in this study and the results presented in this report are characterized by limitations arising from the restricted amount of information available in the main data sources. Yet results of any projection are driven by the underlying assumptions. By making these assumptions transparent and by openly discussing possible sources of errors in this report, users of these regional projections can make their own judgments regarding the uncertainties involved and the implications for the studies in which the projections will be used. We believe that the assumptions we used to produce these regional projections are sufficiently reasonable and defensible. Accordingly, the numbers computed under the different scenarios can serve as useful input to studies of regional socioeconomic development in China looking at the next few decades.

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APPENDIX

This Appendix presents detailed results of the regional projections for the 31 provinces and for the 8 LUC-regions:

- the initial conditions for all five scenarios for the year 2000;
- results of the regional projections for the four scenarios for the years 2015 and 2030;
- the underlying assumptions for the four scenarios are also listed.

Initial conditions for all five scenarios for the year 2000 (1000 people)

Note: Data in this table are based on the harmonization of Cao's (2008) national level initial starting values with the year 2000 census data (see Section 2 for explanation)

YEAR:2000

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1258	8378	886	637	2205	257	10522	3099	13621	77.25
Tianjin	998	5484	608	717	1885	220	7090	2823	9913	71.52
Hebei	3334	13204	1021	13012	33590	3678	17560	50280	67840	25.88
Shanxi	2553	8269	609	6463	13791	1446	11432	21700	33132	34.50
Inner-Mongolia	1951	7512	497	3310	9575	788	9959	13672	23631	42.14
Liaoning	3541	17599	1826	4254	13535	1471	22966	19260	42226	54.39
Jilin	2221	10267	822	3108	9843	797	13311	13749	27060	49.19
Heilongjiang	3164	14378	1129	4033	12999	886	18672	17918	36590	51.03
Shanghai	1764	11088	1638	275	1429	242	14490	1945	16435	88.16
Jiangsu	5304	23239	2320	9872	29005	4138	30862	43015	73877	41.78
Zhejiang	3610	17144	1602	5219	16395	2496	22357	24110	46466	48.11
Anhui	3352	11360	1054	12869	28120	3426	15766	44414	60181	26.20
Fujian	2681	10782	844	5645	13192	1436	14307	20273	34579	41.37
Jiangxi	2377	8174	634	8977	19228	1898	11185	30103	41288	27.09
Shandong	6421	25635	2270	13473	38285	5039	34326	56797	91123	37.67
Henan	4611	15524	1251	20844	45605	5231	21385	71681	93066	22.98
Hubei	4692	18027	1370	9642	24092	2449	24089	36183	60272	39.97
Hunan	3242	13092	1063	11779	31456	3663	17398	46898	64296	27.06
Guangdong	8998	36084	2350	12899	23330	2910	47432	39139	86571	54.79
Guangxi	2596	8994	761	9818	20173	2442	12350	32433	44784	27.58
Hainan	725	2182	167	1498	2794	343	3075	4635	7709	39.88
Chongqing	1704	7610	781	5533	13795	1664	10096	20992	31087	32.47
Sichuan	3935	16851	1524	16315	40668	4705	22310	61688	83998	26.56
Guizhou	2025	5947	474	9681	16564	1629	8445	27875	36321	23.25
Yunnan	1928	7424	550	10196	21359	2030	9903	33585	43488	22.77
Tibet	109	384	16	798	1292	109	508	2198	2707	18.78
Shaanxi	2245	8462	661	7199	15907	1515	11368	24621	35989	31.59
Gansu	1173	4546	300	6196	12504	1008	6018	19708	25727	23.39
Qinghai	318	1170	72	1097	2138	148	1559	3383	4942	31.55
Ningxia	380	1317	82	1320	2367	163	1780	3851	5631	31.61
Xinjiang	1298	4669	281	4153	7895	582	6247	12629	18877	33.10
Total 31prov	84510	344796	29465	220831	525015	58809	458771	804655	1263426	36.31
North	19175	76495	6646	55146	135362	15871	102316	206379	308695	33.14
Northeast	8926	42245	3778	11395	36377	3155	54949	50927	105876	51.90
East	14029	62830	6615	28234	74948	10302	83475	113484	196959	42.38
Central	10311	39293	3067	30398	74776	8010	52672	113184	165855	31.76
South	12405	49048	3361	20043	39316	4688	64814	64046	128860	50.30
Southwest	12190	46825	4090	51543	112559	12471	63104	176573	239678	26.33
Plateau	426	1554	88	1894	3430	257	2068	5581	7649	27.03
Northwest	7047	26506	1820	22178	48247	4056	35373	74481	109854	32.20

Medium – MM scenario

Assumptions

Urban

Life Expectancy

Year	Males	Females
2000-2005	73.50	77.39
2005-2010	73.83	78.03
2010-2015	74.17	78.71
2015-2020	74.53	79.42
2020-2025	74.89	80.17
2025-2030	75.25	80.97

Total Fertility Rate

Year	TFR
2000-2005	1.28
2005-2010	1.28
2010-2015	1.27
2015-2020	1.26
2020-2025	1.27
2025-2030	1.26

Net Migration

Year	Males	Females
2000-2005	26,221,443	26,871,035
2005-2010	24,910,371	25,527,483
2010-2015	23,664,853	24,251,109
2015-2020	22,481,610	23,038,553
2020-2025	21,357,530	21,886,626
2025-2030	20,289,653	20,792,294

Rural

Life Expectancy

Year	Males	Females
2000-2005	68.89	72.09
2005-2010	69.34	72.72
2010-2015	69.81	73.36
2015-2020	70.29	74.03
2020-2025	70.79	74.73
2025-2030	71.31	75.45

Total Fertility Rate

Year	TFR
2000-2005	1.95
2005-2010	1.90
2010-2015	1.90
2015-2020	1.87
2020-2025	1.85
2025-2030	1.83

Net Migration

Year	Males	Females
2000-2005	-26,221,443	-26,871,035
2005-2010	-24,910,371	-25,527,483
2010-2015	-23,664,853	-24,251,109
2015-2020	-22,481,610	-23,038,553
2020-2025	-21,357,530	-21,886,626
2025-2030	-20,289,653	-20,792,294

Projections (1000 people)

MEDIUM PROJECTION (MM)

YEAR:2015

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1763	12382	1406	428	1747	337	15551	2512	18063	86.09
Tianjin	1147	6827	951	519	1521	280	8925	2320	11245	79.37
Hebei	4473	21115	2159	8160	31869	5158	27747	45187	72934	38.04
Shanxi	3025	13052	1219	4459	14053	2024	17295	20536	37832	45.72
Inner-Mongolia	2378	10072	1043	2453	8476	1252	13493	12181	25675	52.55
Liaoning	3569	20619	2893	2960	11024	2062	27081	16046	43127	62.79
Jilin	2491	13102	1584	2051	8613	1317	17178	11981	29159	58.91
Heilongjiang	3289	16374	2207	2688	10341	1637	21870	14666	36536	59.86
Shanghai	2392	15618	2054	95	649	235	20064	979	21042	95.35
Jiangsu	6056	31579	3894	5863	24807	5163	41529	35832	77361	53.68
Zhejiang	4078	23910	2558	3639	14433	2890	30546	20961	51507	59.30
Anhui	4083	16428	1845	7617	24552	4519	22356	36689	59045	37.86
Fujian	3237	16359	1390	3795	13282	1722	20985	18799	39784	52.75
Jiangxi	3127	12221	1182	6150	18092	2540	16530	26782	43312	38.16
Shandong	7567	37078	4079	8238	33375	6417	48724	48030	96754	50.36
Henan	5785	25470	2488	12051	42839	6887	33743	61777	95520	35.33
Hubei	5661	25253	2647	5868	21859	3513	33560	31240	64800	51.79
Hunan	4018	18534	2089	7198	27157	4900	24640	39256	63896	38.56
Guangdong	12689	65445	4173	10698	27977	3499	82307	42174	124481	66.12
Guangxi	3169	13265	1334	6132	18135	3022	17768	27289	45058	39.43
Hainan	900	3594	292	1067	3003	380	4786	4450	9236	51.82
Chongqing	1915	10615	1349	3291	12702	2542	13879	18535	32414	42.82
Sichuan	5267	22113	2862	10668	34173	6970	30242	51810	82053	36.86
Guizhou	2795	9167	917	6643	15873	2499	12879	25015	37894	33.99
Yunnan	3328	12704	1058	7853	21868	2780	17091	32501	49592	34.46
Tibet	224	736	42	749	1492	167	1002	2408	3410	29.39
Shaanxi	2667	11926	1328	4263	14819	2388	15921	21470	37391	42.58
Gansu	1690	7542	750	3879	13174	1923	9982	18976	28958	34.47
Qinghai	448	1733	171	859	2210	262	2352	3332	5683	41.38
Ningxia	523	2267	194	1004	2759	299	2985	4062	7047	42.35
Xinjiang	2040	8187	690	3428	9537	1040	10918	14005	24922	43.81
Total 31prov	105796	505288	52845	144766	486411	80624	663929	711801	1375731	48.26
North	23760	115924	12301	33856	125404	21103	151985	180362	332348	45.73
Northeast	9349	50096	6684	7698	29979	5016	66129	42693	108822	60.77
East	16609	87535	10351	17213	64440	12806	114495	94460	208955	54.79
Central	12806	56008	5917	19216	67109	10953	74730	97278	172008	43.45
South	16826	85398	5855	15560	44262	5601	108079	65423	173502	62.29
Southwest	16475	67865	7520	34587	102751	17813	91859	155150	247010	37.19
Plateau	672	2469	213	1609	3702	429	3354	5740	9094	36.88
Northwest	9299	39994	4004	15028	48765	6902	53298	70695	123993	42.98

MM
YEAR:2030

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1945	15170	3064	208	709	588	20179	1506	21684	93.06
Tianjin	1136	7162	1954	308	822	460	10252	1589	11842	86.58
Hebei	4621	26500	4587	5337	22846	8918	35709	37101	72810	49.04
Shanxi	3202	16593	2763	3064	10801	3526	22557	17392	39949	56.46
Inner-Mongolia	2266	11304	2364	1538	5713	2412	15934	9662	25596	62.25
Liaoning	3265	19309	6151	1772	6446	3573	28725	11791	40515	70.90
Jilin	2333	13734	3512	1250	5514	2549	19579	9313	28893	67.77
Heilongjiang	2741	14619	4793	1463	5998	3192	22154	10653	32806	67.53
Shanghai	2444	17588	4156	1	117	234	24188	352	24539	98.57
Jiangsu	5783	35492	7507	3614	15976	7474	48783	27065	75847	64.32
Zhejiang	4125	27610	5602	2392	9459	4591	37338	16442	53779	69.43
Anhui	3906	18366	3402	4601	16743	6047	25675	27391	53066	48.38
Fujian	3266	20228	3115	2507	10317	3106	26609	15930	42540	62.55
Jiangxi	3070	14814	2439	3828	13395	4181	20323	21403	41726	48.71
Shandong	7486	42704	8391	5314	21953	10319	58580	37586	96166	60.92
Henan	5868	31111	5086	7579	30360	10864	42064	48802	90867	46.29
Hubei	5317	28953	5562	3595	14947	5834	39832	24375	64207	62.04
Hunan	3770	20564	4141	4300	18277	7307	28475	29884	58359	48.79
Guangdong	15423	94265	10222	8498	25083	6113	119909	39694	159603	75.13
Guangxi	2926	15179	2636	3573	12877	4261	20741	20711	41452	50.04
Hainan	928	4792	657	728	2504	645	6377	3877	10253	62.19
Chongqing	2003	12281	2562	2196	9248	3353	16846	14797	31643	53.24
Sichuan	4902	24373	5098	6237	23020	9241	34373	38497	72870	47.17
Guizhou	2861	11868	1646	4227	12250	3216	16375	19694	36069	45.40
Yunnan	3812	18080	2131	5526	18364	4397	24023	28287	52311	45.92
Tibet	311	1186	112	621	1503	255	1609	2378	3987	40.35
Shaanxi	2501	13649	2590	2585	10219	3904	18740	16708	35448	52.87
Gansu	1905	10204	1470	2730	10780	2871	13579	16380	29960	45.33
Qinghai	482	2243	330	595	1908	408	3055	2910	5965	51.21
Ningxia	605	3209	415	739	2528	528	4230	3795	8025	52.71
Xinjiang	2404	12211	1389	2624	9206	1699	16005	13530	29534	54.19
Total 31prov	107610	605362	109845	93547	349882	126067	822816	569497	1392313	59.10
North	24258	139238	25844	21810	87491	34676	189341	143977	333318	56.80
Northeast	8339	47662	14456	4485	17957	9315	70458	31756	102214	68.93
East	16259	99056	20667	10608	42295	18345	135982	71249	207231	65.62
Central	12158	64331	12141	11722	46619	17321	88630	75662	164292	53.95
South	19617	119285	13994	11733	37904	9864	152895	59501	212396	71.99
Southwest	16504	81782	14072	21758	75759	24470	112359	121987	234346	47.95
Plateau	793	3429	442	1215	3411	663	4664	5289	9952	46.86
Northwest	9682	50578	8228	10215	38446	11414	68488	60075	128563	53.27

Low scenario

Assumptions

Urban

Life Expectancy

Year	Males	Females
2000-2005	73.50	77.39
2005-2010	73.83	78.03
2010-2015	74.17	78.71
2015-2020	74.52	79.42
2020-2025	74.87	80.17
2025-2030	75.23	80.97

Total Fertility Rate

Year	TFR
2000-2005	1.28
2005-2010	1.25
2010-2015	1.22
2015-2020	1.18
2020-2025	1.14
2025-2030	1.10

Net Migration

Year	Males	Females
2000-2005	26221443	26871035
2005-2010	26221443	26871035
2010-2015	26221443	26871035
2015-2020	26221443	26871035
2020-2025	26221443	26871035
2025-2030	26221443	26871035

Rural

Life Expectancy

Year	Males	Females
2000-2005	68.89	72.09
2005-2010	69.34	72.72
2010-2015	69.81	73.36
2015-2020	70.29	74.03
2020-2025	70.79	74.73
2025-2030	71.31	75.45

Total Fertility Rate

Year	TFR
2000-2005	1.95
2005-2010	1.86
2010-2015	1.85
2015-2020	1.79
2020-2025	1.75
2025-2030	1.70

Net Migration

Year	Males	Females
2000-2005	-26221443	-26871035
2005-2010	-26221443	-26871035
2010-2015	-26221443	-26871035
2015-2020	-26221443	-26871035
2020-2025	-26221443	-26871035
2025-2030	-26221443	-26871035

Projections (1000 people)

LOW PROJECTION										
YEAR:2015										
Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1736	12444	1407	417	1685	336	15588	2438	18026	86.47
Tianjin	1128	6843	952	507	1505	279	8923	2291	11214	79.57
Hebei	4409	21512	2165	7983	31473	5153	28086	44609	72694	38.64
Shanxi	2978	13256	1221	4361	13850	2021	17456	20233	37688	46.32
Inner-Mongolia	2340	10192	1044	2399	8357	1250	13576	12006	25582	53.07
Liaoning	3511	20801	2897	2893	10844	2059	27209	15795	43004	63.27
Jilin	2451	13235	1586	2005	8481	1315	17273	11801	29074	59.41
Heilongjiang	3235	16525	2210	2627	10191	1634	21969	14452	36422	60.32
Shanghai	2355	15644	2055	90	623	233	20054	946	21000	95.49
Jiangsu	5962	31971	3902	5733	24416	5155	41834	35304	77138	54.23
Zhejiang	4014	24164	2562	3558	14180	2885	30740	20624	51364	59.85
Anhui	4023	16737	1850	7448	24244	4514	22610	36206	58816	38.44
Fujian	3187	16576	1392	3713	13065	1720	21155	18497	39653	53.35
Jiangxi	3081	12446	1185	6015	17868	2538	16712	26421	43133	38.74
Shandong	7448	37582	4088	8055	32873	6408	49118	47336	96454	50.92
Henan	5704	26002	2496	11788	42309	6879	34201	60976	95177	35.93
Hubei	5572	25590	2652	5737	21523	3508	33813	30769	64582	52.36
Hunan	3959	18854	2094	7041	26838	4895	24908	38774	63682	39.11
Guangdong	12485	66182	4179	10461	27242	3493	82847	41196	124043	66.79
Guangxi	3124	13514	1338	5998	17888	3019	17975	26904	44879	40.05
Hainan	886	3646	293	1043	2951	380	4825	4374	9199	52.45
Chongqing	1888	10779	1352	3220	12538	2539	14019	18297	32316	43.38
Sichuan	5192	22497	2870	10435	33790	6962	30559	51187	81746	37.38
Guizhou	2755	9363	920	6497	15677	2497	13038	24670	37708	34.58
Yunnan	3282	12980	1061	7681	21594	2777	17322	32052	49374	35.08
Tibet	221	755	42	733	1473	167	1017	2373	3390	30.01
Shaanxi	2627	12120	1331	4170	14625	2385	16079	21181	37259	43.15
Gansu	1667	7699	752	3795	13017	1921	10117	18733	28851	35.07
Qinghai	441	1762	171	841	2181	261	2375	3283	5658	41.97
Ningxia	516	2308	195	982	2718	299	3018	3999	7017	43.01
Xinjiang	2009	8327	691	3353	9397	1039	11028	13789	24817	44.44
Total 31prov	104187	512304	52952	141580	479419	80519	669444	701518	1370962	48.83
North	23403	117639	12329	33111	123694	21076	153371	177882	331253	46.30
Northeast	9197	50561	6693	7525	29516	5008	66451	42048	108499	61.25
East	16354	88515	10369	16829	63463	12788	115238	93081	208319	55.32
Central	12613	56890	5931	18794	66230	10940	75433	95964	171397	44.01
South	16558	86405	5864	15217	43259	5592	108827	64068	172895	62.94
Southwest	16241	69132	7540	33831	101487	17793	92913	153111	246024	37.77
Plateau	662	2517	213	1573	3655	428	3392	5656	9048	37.49
Northwest	9159	40646	4013	14700	48115	6894	53818	69708	123527	43.57

**Low
YEAR:2030**

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1855	15258	3076	135	586	577	20188	1298	21486	93.96
Tianjin	1079	7348	1962	244	606	453	10389	1303	11692	88.86
Hebei	4502	28292	4634	4572	20825	8874	37429	34271	71700	52.20
Shanxi	3093	17605	2784	2613	9651	3506	23482	15770	39252	59.82
Inner-Mongolia	2166	11834	2380	1294	5093	2397	16380	8783	25164	65.09
Liaoning	3113	20072	6183	1479	5566	3543	29367	10589	39956	73.50
Jilin	2227	14310	3532	1043	4856	2531	20069	8429	28499	70.42
Heilongjiang	2601	15149	4820	1214	5356	3167	22570	9738	32308	69.86
Shanghai	2256	17563	4170	7	104	220	23989	331	24320	98.64
Jiangsu	5547	37194	7559	3035	14065	7426	50301	24525	74826	67.22
Zhejiang	3955	28838	5637	2008	8095	4558	38430	14662	53092	72.38
Anhui	3785	19548	3435	3921	15343	6016	26768	25280	52048	51.43
Fujian	3143	21257	3136	2127	9163	3086	27537	14376	41913	65.70
Jiangxi	2983	15816	2462	3275	12222	4159	21261	19657	40918	51.96
Shandong	7180	44826	8455	4490	19545	10258	60460	34293	94754	63.81
Henan	5726	33315	5142	6485	27825	10811	44184	45121	89304	49.48
Hubei	5092	30378	5601	3027	13316	5797	41071	22140	63211	64.97
Hunan	3658	21836	4180	3674	16803	7270	29674	27746	57420	51.68
Guangdong	14774	98539	10277	7132	20388	6061	123590	33581	157171	78.63
Guangxi	2839	16163	2660	3051	11721	4239	21662	19010	40672	53.26
Hainan	890	5052	662	618	2207	641	6604	3466	10070	65.58
Chongqing	1947	13048	2582	1880	8388	3334	17577	13602	31180	56.37
Sichuan	4764	25956	5147	5331	21142	9195	35867	35669	71536	50.14
Guizhou	2790	12796	1663	3622	11146	3201	17248	17970	35217	48.98
Yunnan	3739	19514	2154	4748	16727	4376	25408	25851	51259	49.57
Tibet	308	1295	113	536	1375	254	1716	2165	3880	44.21
Shaanxi	2418	14469	2612	2206	9274	3883	19500	15363	34863	55.93
Gansu	1867	10983	1485	2351	9898	2857	14335	15106	29441	48.69
Qinghai	468	2393	332	510	1733	406	3193	2649	5842	54.66
Ningxia	590	3432	418	635	2276	525	4440	3436	7876	56.38
Xinjiang	2334	13028	1399	2252	8291	1689	16762	12232	28994	57.81
Total 31prov	103690	637109	110653	79516	313586	125310	851451	518412	1369864	62.16
North	23435	146644	26054	18539	79038	34479	196132	132056	328188	59.76
Northeast	7940	49531	14535	3736	15779	9241	72006	28756	100762	71.46
East	15544	103144	20801	8971	37607	18220	139488	64798	204286	68.28
Central	11733	68030	12243	9976	42341	17226	92006	69543	161549	56.95
South	18808	124848	14075	9877	31758	9788	157731	51423	209154	75.41
Southwest	16080	87477	14206	18633	69124	24345	117762	112101	229864	51.23
Plateau	775	3688	446	1046	3109	659	4909	4814	9723	50.49
Northwest	9375	53747	8295	8738	34831	11352	71416	54921	126338	56.53

High scenario

Assumptions

Urban

Life Expectancy

Year	Males	Females
2000-2005	73.50	77.39
2005-2010	73.83	78.03
2010-2015	74.17	78.71
2015-2020	74.53	79.42
2020-2025	74.89	80.17
2025-2030	75.25	80.97

Total Fertility Rate

Year	TFR
2000-2005	1.28
2005-2010	1.30
2010-2015	1.31
2015-2020	1.31
2020-2025	1.34
2025-2030	1.35

Net Migration

Year	Males	Females
2000-2005	26,221,443	26,871,035
2005-2010	23,599,299	24,183,931
2010-2015	21,239,369	21,765,538
2015-2020	19,115,432	19,588,984
2020-2025	17,203,889	17,630,086
2025-2030	15,483,500	15,867,077

Rural

Life Expectancy

Year	Males	Females
2000-2005	68.89	72.09
2005-2010	69.34	72.72
2010-2015	69.81	73.36
2015-2020	70.29	74.03
2020-2025	70.79	74.73
2025-2030	71.31	75.45

Total Fertility Rate

Year	TFR
2000-2005	1.95
2005-2010	1.95
2010-2015	2.00
2015-2020	2.02
2020-2025	2.05
2025-2030	2.08

Net Migration

Year	Males	Females
2000-2005	-26,221,443	-26,871,035
2005-2010	-23,599,299	-24,183,931
2010-2015	-21,239,369	-21,765,538
2015-2020	-19,115,432	-19,588,984
2020-2025	-17,203,889	-17,630,086
2025-2030	-15,483,500	-15,867,077

Projection (1000 people)

HIGH PROJECTION										
YEAR:2015										
Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1784	12322	1405	451	1806	338	15510	2596	18107	85.66
Tianjin	1160	6779	950	541	1569	281	8890	2391	11280	78.81
Hebei	4473	20734	2153	8438	32249	5164	27360	45851	73211	37.37
Shanxi	3035	12856	1216	4616	14249	2026	17108	20891	37998	45.02
Inner-Mongolia	2397	9957	1041	2543	8591	1254	13395	12387	25782	51.95
Liaoning	3601	20444	2889	3071	11199	2066	26935	16335	43270	62.25
Jilin	2513	12974	1582	2128	8741	1319	17069	12188	29257	58.34
Heilongjiang	3320	16230	2204	2789	10485	1640	21753	14914	36668	59.33
Shanghai	2423	15593	2052	114	673	236	20068	1023	21091	95.15
Jiangsu	6094	31201	3887	6083	25183	5170	41182	36436	77618	53.06
Zhejiang	4108	23666	2554	3775	14676	2894	30328	21345	51672	58.69
Anhui	4083	16130	1840	7882	24849	4524	22053	37255	59308	37.18
Fujian	3255	16150	1387	3930	13490	1724	20792	19145	39936	52.06
Jiangxi	3127	12006	1179	6358	18307	2543	16312	27208	43519	37.48
Shandong	7607	36593	4071	8546	33859	6425	48271	48830	97100	49.71
Henan	5772	24959	2480	12463	43348	6895	33212	62706	95917	34.63
Hubei	5698	24928	2642	6084	22183	3517	33269	31784	65052	51.14
Hunan	4021	18226	2083	7444	27464	4906	24330	39813	64143	37.93
Guangdong	12790	64734	4167	11107	28686	3504	81691	43297	124988	65.36
Guangxi	3168	13027	1331	6340	18373	3025	17525	27738	45264	38.72
Hainan	905	3544	292	1104	3053	381	4741	4538	9279	51.09
Chongqing	1917	10457	1346	3404	12860	2545	13719	18808	32527	42.18
Sichuan	5262	21744	2854	11028	34540	6977	29860	52546	82406	36.24
Guizhou	2789	8978	914	6865	16061	2502	12681	25427	38108	33.28
Yunnan	3316	12441	1055	8118	22131	2783	16811	33032	49843	33.73
Tibet	222	719	42	774	1509	167	983	2451	3433	28.62
Shaanxi	2675	11740	1325	4409	15005	2391	15739	21805	37544	41.92
Gansu	1686	7391	748	4008	13324	1925	9824	19257	29082	33.78
Qinghai	449	1704	171	888	2238	262	2324	3389	5713	40.68
Ningxia	523	2228	194	1038	2798	300	2945	4136	7081	41.59
Xinjiang	2045	8053	689	3545	9670	1041	10787	14257	25044	43.07
Total 31prov	106218	498507	52741	149882	493169	80726	657466	723776	1381243	47.60
North	23832	114243	12275	35055	127079	21129	150350	183263	333613	45.07
Northeast	9435	49648	6675	7988	30425	5025	65758	43437	109195	60.22
East	16708	86590	10333	17853	65382	12824	113631	96059	209690	54.19
Central	12846	55160	5904	19885	67954	10966	73910	98805	172715	42.79
South	16950	84427	5847	16141	45230	5609	107224	66980	174203	61.55
Southwest	16451	66647	7500	35755	103964	17832	90597	157552	248149	36.51
Plateau	671	2423	212	1663	3747	429	3306	5840	9146	36.15
Northwest	9326	39369	3996	15543	49388	6910	52691	71841	124532	42.31

**High
YEAR:2030**

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1988	15062	3053	332	858	599	20103	1788	21891	91.83
Tianjin	1161	6963	1947	407	1054	467	10071	1928	11999	83.94
Hebei	4477	24885	4545	6391	24727	8958	33908	40075	73983	45.83
Shanxi	3150	15683	2743	3694	11871	3545	21576	19110	40686	53.03
Inner-Mongolia	2274	10827	2349	1884	6293	2426	15451	10603	26054	59.30
Liaoning	3298	18625	6122	2196	7265	3600	28045	13061	41105	68.23
Jilin	2354	13216	3494	1552	6126	2567	19064	10244	29308	65.05
Heilongjiang	2782	14144	4770	1822	6602	3214	21696	11639	33334	65.09
Shanghai	2624	17609	4143	7	140	245	24375	392	24767	98.42
Jiangsu	5777	33956	7461	4457	17755	7518	47193	29730	76923	61.35
Zhejiang	4134	26506	5571	2951	10720	4620	36211	18291	54502	66.44
Anhui	3798	17296	3372	5538	18066	6075	24467	29678	54145	45.19
Fujian	3245	19303	3096	3045	11388	3124	25643	17558	43201	59.36
Jiangxi	2978	13911	2419	4581	14495	4200	19308	23276	42583	45.34
Shandong	7458	40783	8332	6502	24207	10373	56574	41082	97656	57.93
Henan	5641	29119	5035	9080	32734	10911	39795	52725	92521	43.01
Hubei	5317	27669	5526	4411	16470	5867	38513	26747	65260	59.01
Hunan	3670	19416	4105	5160	19660	7340	27191	32161	59352	45.81
Guangdong	15491	90418	10172	10498	29419	6160	116080	46076	162157	71.59
Guangxi	2841	14290	2614	4289	13966	4282	19744	22536	42281	46.70
Hainan	925	4557	653	883	2779	649	6136	4311	10447	58.73
Chongqing	1948	11592	2543	2632	10046	3371	16083	16048	32131	50.05
Sichuan	4743	22945	5054	7473	24789	9282	32742	41544	74286	44.08
Guizhou	2748	11035	1631	5042	13289	3230	15415	21561	36976	41.69
Yunnan	3634	16789	2110	6584	19890	4417	22534	30891	53425	42.18
Tibet	291	1088	111	732	1623	256	1489	2611	4101	36.32
Shaanxi	2454	12911	2570	3108	11102	3923	17935	18132	36068	49.73
Gansu	1823	9505	1457	3241	11598	2884	12785	17722	30508	41.91
Qinghai	469	2109	328	710	2071	410	2905	3190	6096	47.66
Ningxia	586	3009	412	883	2761	531	4007	4175	8182	48.98
Xinjiang	2348	11479	1379	3135	10053	1708	15207	14897	30104	50.52
Total 31prov	106431	576700	109116	113219	383815	126749	792248	623782	1416030	55.95
North	23877	132495	25655	26405	95450	34852	182027	156708	338735	53.74
Northeast	8433	45986	14385	5570	19993	9381	68804	34943	103747	66.32
East	16333	95367	20547	12952	46681	18458	132246	78091	210337	62.87
Central	11966	60996	12050	14152	50625	17407	85011	82184	167195	50.85
South	19661	114278	13921	14426	43586	9933	147860	67945	215805	68.52
Southwest	15914	76651	13952	26020	81979	24582	106518	132581	239099	44.55
Plateau	760	3196	439	1442	3693	666	4395	5801	10196	43.10
Northwest	9486	47732	8168	12251	41808	11471	65386	65529	130915	49.95

High2 scenario

Assumptions

Urban

Life Expectancy		
Year	Males	Females
2000-2005	73.50	77.39
2005-2010	73.83	78.03
2010-2015	74.17	78.71
2015-2020	74.53	79.42
2020-2025	74.89	80.17
2025-2030	75.26	80.97
Total Fertility Rate		
Year	TFR	
2000-2005	1.28	
2005-2010	1.32	
2010-2015	1.35	
2015-2020	1.39	
2020-2025	1.47	
2025-2030	1.54	
Net Migration		
Year	Males	Females
2000-2005	26,221,443	26,871,035
2005-2010	23,599,299	24,183,931
2010-2015	21,239,369	21,765,538
2015-2020	19,115,432	19,588,984
2020-2025	17,203,889	17,630,086
2025-2030	15,483,500	15,867,077

Rural

Life Expectancy		
Year	Males	Females
2000-2005	68.89	72.09
2005-2010	69.34	72.72
2010-2015	69.81	73.36
2015-2020	70.29	74.03
2020-2025	70.79	74.73
2025-2030	71.31	75.45
Total Fertility Rate		
Year	TFR	
2000-2005	1.95	
2005-2010	1.95	
2010-2015	2.00	
2015-2020	2.02	
2020-2025	2.05	
2025-2030	2.08	
Net Migration		
Year	Males	Females
2000-2005	-26,221,443	-26,871,035
2005-2010	-23,599,299	-24,183,931
2010-2015	-21,239,369	-21,765,538
2015-2020	-19,115,432	-19,588,984
2020-2025	-17,203,889	-17,630,086
2025-2030	-15,483,500	-15,867,077

Projections (1000 people)

HIGH2 PROJECTION										
YEAR:2015										
Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1803	12322	1405	446	1806	338	15530	2591	18121	85.70
Tianjin	1175	6779	950	539	1569	281	8904	2388	11292	78.85
Hebei	4559	20734	2153	8443	32249	5164	27446	45855	73301	37.44
Shanxi	3088	12856	1216	4617	14249	2026	17161	20892	38052	45.10
Inner-Mongolia	2433	9957	1041	2542	8591	1254	13431	12386	25817	52.02
Liaoning	3652	20444	2889	3067	11199	2066	26986	16331	43317	62.30
Jilin	2548	12974	1582	2125	8741	1319	17105	12185	29290	58.40
Heilongjiang	3366	16230	2204	2786	10485	1640	21800	14911	36711	59.38
Shanghai	2447	15593	2052	105	673	236	20093	1015	21107	95.19
Jiangsu	6188	31201	3887	6073	25183	5170	41275	36427	77702	53.12
Zhejiang	4168	23666	2554	3769	14676	2894	30388	21338	51726	58.75
Anhui	4164	16130	1840	7887	24849	4524	22134	37260	59394	37.27
Fujian	3306	16150	1387	3928	13490	1724	20843	19143	39986	52.13
Jiangxi	3188	12006	1179	6364	18307	2543	16372	27214	43587	37.56
Shandong	7731	36593	4071	8535	33859	6425	48395	48819	97213	49.78
Henan	5892	24959	2480	12473	43348	6895	33331	62715	96047	34.70
Hubei	5786	24928	2642	6078	22183	3517	33357	31778	65135	51.21
Hunan	4097	18226	2083	7449	27464	4906	24406	39818	64224	38.00
Guangdong	12977	64734	4167	11085	28686	3504	81878	43276	125154	65.42
Guangxi	3230	13027	1331	6346	18373	3025	17587	27744	45331	38.80
Hainan	919	3544	292	1104	3053	381	4755	4538	9293	51.17
Chongqing	1953	10457	1346	3405	12860	2545	13755	18809	32564	42.24
Sichuan	5367	21744	2854	11039	34540	6977	29965	52556	82522	36.31
Guizhou	2848	8978	914	6875	16061	2502	12740	25438	38178	33.37
Yunnan	3388	12441	1055	8128	22131	2783	16884	33042	49925	33.82
Tibet	228	719	42	776	1509	167	988	2452	3441	28.73
Shaanxi	2722	11740	1325	4412	15005	2391	15787	21807	37594	41.99
Gansu	1722	7391	748	4013	13324	1925	9860	19263	29122	33.86
Qinghai	457	1704	171	889	2238	262	2332	3390	5722	40.76
Ningxia	534	2228	194	1039	2798	300	2955	4136	7092	41.67
Xinjiang	2082	8053	689	3547	9670	1041	10824	14259	25083	43.15
Total 31prov	108018	498507	52741	149882	493169	80726	659266	723776	1383043	47.67
North	24248	114243	12275	35052	127079	21129	150766	183260	334026	45.14
Northeast	9567	49648	6675	7977	30425	5025	65890	43427	109317	60.27
East	16967	86590	10333	17834	65382	12824	113890	96040	209930	54.25
Central	13071	55160	5904	19891	67954	10966	74135	98811	172945	42.87
South	17203	84427	5847	16118	45230	5609	107476	66957	174433	61.61
Southwest	16785	66647	7500	35792	103964	17832	90932	157589	248520	36.59
Plateau	685	2423	212	1666	3747	429	3321	5842	9163	36.24
Northwest	9492	39369	3996	15553	49388	6910	52857	71851	124708	42.38

High2
YEAR:2030

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	2118	15085	3053	294	849	599	20256	1742	21998	92.08
Tianjin	1247	6978	1947	390	1051	467	10171	1908	12078	84.21
Hebei	4954	24971	4545	6413	24731	8958	34470	40102	74572	46.22
Shanxi	3462	15737	2743	3699	11871	3545	21942	19115	41057	53.44
Inner-Mongolia	2477	10863	2349	1875	6292	2426	15690	10593	26283	59.70
Liaoning	3573	18675	6122	2171	7261	3600	28370	13032	41402	68.52
Jilin	2551	13252	3494	1532	6122	2567	19296	10221	29517	65.37
Heilongjiang	3018	14189	4770	1804	6601	3214	21977	11619	33596	65.41
Shanghai	2726	17625	4143	8	139	245	24494	392	24886	98.42
Jiangsu	6287	34050	7461	4407	17743	7518	47797	29668	77465	61.70
Zhejiang	4484	26569	5571	2914	10711	4620	36624	18245	54869	66.75
Anhui	4217	17371	3372	5571	18076	6075	24960	29722	54682	45.65
Fujian	3541	19356	3096	3033	11385	3124	25993	17542	43535	59.71
Jiangxi	3305	13968	2419	4615	14504	4200	19692	23318	43010	45.78
Shandong	8141	40908	8332	6457	24195	10373	57381	41025	98406	58.31
Henan	6284	29233	5035	9134	32748	10911	40552	52794	93346	43.44
Hubei	5795	27756	5526	4380	16464	5867	39077	26711	65788	59.40
Hunan	4061	19487	4105	5186	19668	7340	27653	32194	59847	46.21
Guangdong	16781	90628	10172	10351	29376	6160	117581	45887	163468	71.93
Guangxi	3155	14348	2614	4318	13975	4282	20116	22575	42691	47.12
Hainan	1011	4572	653	882	2779	649	6236	4309	10545	59.14
Chongqing	2151	11628	2543	2639	10047	3371	16322	16056	32378	50.41
Sichuan	5274	23043	5054	7529	24806	9282	33370	41617	74988	44.50
Guizhou	3073	11090	1631	5100	13302	3230	15794	21632	37426	42.20
Yunnan	4063	16861	2110	6637	19899	4417	23034	30952	53986	42.67
Tibet	329	1093	111	744	1625	256	1534	2624	4158	36.89
Shaanxi	2703	12956	2570	3119	11105	3923	18230	18147	36377	50.11
Gansu	2031	9541	1457	3268	11603	2884	13029	17755	30783	42.32
Qinghai	519	2117	328	716	2072	410	2964	3197	6161	48.11
Ningxia	649	3020	412	888	2762	531	4081	4180	8261	49.40
Xinjiang	2587	11518	1379	3148	10054	1708	15484	14909	30394	50.95
Total 31prov	116569	578486	109116	113219	383815	126749	804171	623782	1427953	56.32
North	26205	132911	25655	26388	95445	34852	184772	156685	341458	54.11
Northeast	9143	46116	14385	5506	19984	9381	69643	34872	104515	66.63
East	17714	95615	20547	12898	46670	18458	133875	78026	211901	63.18
Central	13161	61212	12050	14181	50635	17407	86422	82223	168645	51.25
South	21334	114556	13921	14266	43540	9933	149810	67738	217548	68.86
Southwest	17716	76968	13952	26223	82028	24582	108636	132833	241469	44.99
Plateau	849	3210	439	1459	3696	666	4498	5821	10319	43.59
Northwest	10448	47898	8168	12298	41816	11471	66513	65584	132098	50.35